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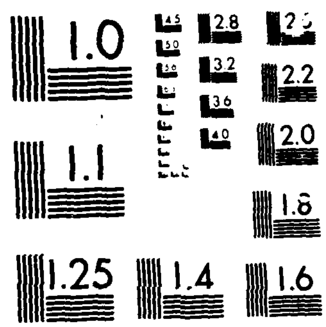

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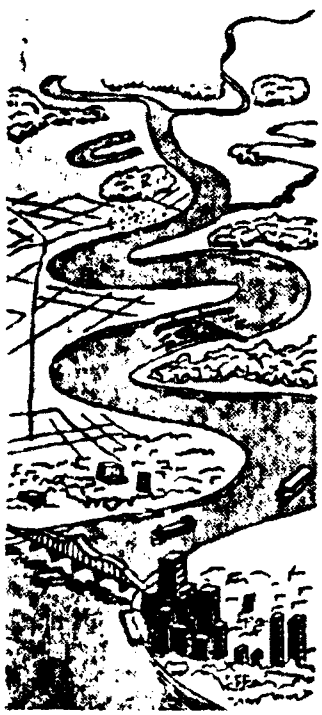

**ENVIRONMENTAL AND WATER QUALITY
OPERATIONAL STUDIES**

TECHNICAL REPORT E-85-13

ANALYSIS AND REVISION OF A RESERVOIR WATER QUALITY MODEL

by

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Environmental Laboratory

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CE-QUAL-R1 is a one-dimensional model that is being developed by the Corps of Engineers to predict and assess the effects of engineering activities on reservoir water quality. Evaluation consisted of tests of the code and comparisons of model predictions with field measured values. Tests of the code included evaluations of the stability of predictions, conservation of mass, time step comparisons, entries of initial values, use of different driving variables, and a check of equation dimensionality.

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20. ABSTRACT (Continued).

Evaluations of model predictions were made using data collected in 1979 and 1980 at DeGray Lake, a Corps of Engineers multipurpose project located in the Ouachita Mountains in south-central Arkansas. Calibration data were collected in 1979, and confirmation data in 1980. Both graphical and statistical tests were used for comparing model predictions with measured values. Variables used in this study were: algae, zooplankton, dissolved organic matter, orthophosphate-phosphorus, ammonia nitrogen, nitrite plus nitrate nitrogen, inorganic carbon, oxygen, pH, alkalinity, and dissolved solids. This report includes an evaluation of different variables, processes, and algorithms that were changed in order to provide a model whose predictions more closely fit measured values.

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PREFACE

The study described in this report was conducted as part of the Environmental and Water Quality Operational Studies (EWQOS) Program, Work Units 31594 (IB.1) and 31595 (IC.1). The EWQOS Program is sponsored by the Office, Chief of Engineers (OCE), US Army, and is assigned to the US Army Engineer Waterways Experiment Station (WES) under the purview of the Environmental Laboratory (EL). The OCE Technical Monitors for EWQOS were Mr. Earl Eiker, Dr. John Bushman, and Mr. James L. Gottesman.

This is an interim report dealing with work conducted to December 1982. Work on evaluation of the model will continue through Fiscal Year 1984.

The work reported herein was conducted by Drs. Joseph H. Wlosinski and Carol D. Collins of the Water Quality Modeling Group (WQMG), Ecosystem Research and Simulation Division (ERSD), EL. The draft report was reviewed by Dr. James L. Martin, Dr. Stephen P. Schreiner, and Mr. Mark S. Dortch, WQMG. The study was conducted under the direct supervision of Mr. Don L. Robey, Chief, ERSD, and under the general supervision of Dr. John Harrison, Chief, EL. Program Manager of EWQOS was Dr. J. L. Mahloch, EL. Editorial review was performed by Ms. Jessica S. Ruff of the WES Publications and Graphic Arts Division.

Director of WES was COL Allen F. Grum, USA. Technical Director was Dr. Robert W. Whalin.

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CONTENTS

ANALYSIS AND REVISION OF A RESERVOIR WATER QUALITY MODEL

PART I: INTRODUCTION

1. CE-QUAL-R1 is a one-dimensional model that is being developed by the Corps of Engineers to realistically predict and assess the effects of engineering activities on reservoir water quality. This report deals with the analysis and revision of that model up to December 1982. Further evaluation is scheduled to continue through Fiscal Year 1984. The purposes of this work were to ensure that the coding of the model is correct and that model predictions are suitable for the needs of Corps of Engineers District and Division offices.

2. The evaluation of model predictions from CE-QUAL-R1 was separated into three tasks, with each task being investigated by a separate group. The three tasks dealt with the predictions of temperature (Johnson and Ford 1981), anaerobic materials (Zimmerman 1985), and other chemical and biological variables. In addition, an evaluation of the model for use by the Aquatic Plant Control Research Program was reported by Wlosinski (1981). Evaluation of model predictions is also being carried out using data collected on a reservoir with different morphometric and biological attributes (Wlosinski and Collins 1985). Variables examined in the analysis and reported here were dissolved organic matter (DOM), algae, zooplankton, orthophosphate-phosphorus (PO4-P), ammonia-nitrogen (NH4-N), nitrite plus nitrate-nitrogen (NO2-N + NO3-N), total inorganic carbon, oxygen, pH, alkalinity, and total dissolved solids (TDS). Data for the analysis were collected at DeGray Lake, Arkansas, in 1979 and 1980.

PART II: BACKGROUND INFORMATION

Model Description

3. CE-QUAL-R1 is a one-dimensional numerical reservoir model that simulates water quality variables in the vertical direction. The thickness of each horizontal layer is dependent upon the balance of inflowing and outflowing water, which permits accurate mass balancing and reduces numerical dispersion during periods of large inflow and outflow.

4. Inflowing waters are distributed vertically based on density differences, which allows simulation of surface flows, interflows, and underflows. Water density is dependent on temperature and the concentrations of dissolved and suspended solids. Outflowing water is withdrawn from layers, considering density stratification, using the selective withdrawal algorithms of Bohan and Grace (1973). Reservoir outflows can be specified by using operation records or the user may opt to have the model choose flows from ports in order to match a downstream target temperature.

5. The heat budget includes the components of short- and long-wave radiation, back radiation, reflected solar and atmospheric radiation, evaporative loss, conductive heat transfers, and gain or loss through inflows and outflows. Vertical transport of thermal energy and mass is achieved through entrainment and turbulent diffusion. Entrainment determines the depth of the upper mixed layer and the onset of stratification. It is calculated from the turbulent kinetic energy influx generated by wind shear and convective mixing using an integral energy approach (Johnson and Ford 1981). Turbulent diffusion is a two-way transport process that is incorporated using a turbulent or eddy diffusion coefficient, which is dependent on the wind speed, magnitude of inflows and outflows, and density stratification.

6. The prediction of water quality is based upon simulation of the interaction of numerous biological and chemical constituents. Forces that directly affect the simulation of the biological and chemical constituents are temperature, irradiation, wind speed, inflow and

outflow rates, and inflowing and outflowing masses. The physical distribution of mass is dependent upon the diffusive and convective processes described above and on settling processes. Besides the physical processes, water quality variables in the model can be affected by photosynthesis, respiration, decay or decomposition, ingestion, egestion, nonpredatory mortality, and harvest. Table 1 lists the process interactions between variables which were included in CE-QUAL-R1 at the beginning of this study. A definitive description of the model can be found in a User's Manual (Environmental Laboratory 1982b).

DeGray Lake

7. DeGray Lake is located in the Ouachita Mountains in south-central Arkansas. Reservoir length is 32 km, with a maximum depth of 57 m. Volume at normal pool is $7.91 \times 10^8 m^3$, with a surface area of $5.34 \times 10^7 m^2$. DeGray Lake is dendritic, with a shoreline development index of 12.8. Project purposes include flood protection, hydropower with pumped storage, recreation, water supply, and low-flow augmentation of the Ouachita River.

8. The reservoir is formed by the DeGray Dam, which is located 12.7 km upstream of the mouth of the Caddo River. The dam is an earth-fill structure with a crest elevation of 138 m above mean sea level. Water is withdrawn through a multilevel outlet structure. From first filling in 1971 to March 1979, water was withdrawn from the surface, after which time the withdrawal level was lowered 12 m. The watershed above the dam is 1,170 km^2, of which approximately 69 percent is classified as forested, 30 percent agricultural, and only 1 percent urban (Perrier, Harris, and Ford 1977).

Evaluation Procedures

9. Procedures for evaluating CE-QUAL-R1 are included in a report by Wlosinski (1984). Methods generally follow recommendations made during a workshop on verification of water quality models which was

convened by the US Environmental Protection Agency (1980). Participants of the workshop recommended evaluation of both software and model predictions. Although they encouraged the use of statistical techniques, they did not recommend any statistics nor did they believe that statistical techniques should supersede engineering judgment.

Evaluation of software

10. The following methods were used to evaluate software:

a. Model equations were checked for dimensionality.

b. Model predictions were checked for stability.

c. Model output was checked for conservation of mass.

d. All variables were checked to ensure that they were initially set.

e. Predictions were checked using different time steps.

f. As suggested by Mihram (1972) and Lawler (1980), model predictions were checked to make sure they were reasonable after changing values of driving variables (boundary conditions).

g. Problems reported by others using the model were thoroughly investigated.

11. The majority of these tests were performed in 1980, with the corrections being made to the code prior to the release of the original User's Manual (Environmental Laboratory 1982a).

Evaluation of model predictions

12. Model predictions were evaluated both graphically and statistically using data from DeGray Lake for 1979 and 1980. Although a number of statistical tests were available (see Wlosinski 1984), most of the comparisons for the study were made using the Reliability Index (RI) of Leggett and Williams (1981). As the predicted versus measured values diverge, the RI becomes larger. Because the RI does not depend on whether the observed or predicted value is greater, and since it is scale variant, it appears to be the best statistic for aggregating and comparing results of different variables.

13. Statistics were calculated for vertical profiles for each variable on those dates when data were collected, and for each variable summed over depths and dates. The value of the RI is 1.0 in the case of

perfect prediction. If all comparisons were within a factor of two of each other, the RI would be 2.0. An RI of 10.0 signifies that the differences between measured and predicted values were an average of one order of magnitude apart; an RI of 100.0 signifies the values were two orders of magnitude apart. The RI was used for comparing predictions for different model algorithms, processes, structures, or calibration values. These comparisons were made using data collected at Station 4, located near the dam. This was done because model predictions, in general, better represent conditions in the main pool of the reservoir, and more data were collected at that station.

14. Although the model is one-dimensional and considers each layer as a completely mixed reactor, the reader should be aware that this is not the case in the real system. Nutrient inputs to a modeled reservoir layer become instantaneously mixed throughout that layer, whereas in the real system a continuum of changing conditions can be seen as one progresses from the headwater area to the dam (Thornton et al. 1980).

15. In addition to comparing the mass of predicted and measured state variables, fluxes predicted by CE-QUAL-R1 were also compared with measured values. This was done in order to ensure a more reliable model, for it is possible to predict the sa concentrations with different sets of coefficients (Wlosinski 1985).

PART III: EVALUATION OF SOFTWARE

Stability of Model Predictions

16. When the model predictions were originally checked for stability, problems occurred for those variables associated with the bottom of the reservoir. At the time this problem was investigated, these variables were organic sediment and benthos; however, since then, a number of variables representing anaerobic materials have been added. Sample results obtained from the original model for the bottom three layers of sediment are shown in the upper part of Table 2. Although the value for sediment should be fairly stable over short periods of time, predicted values for the bottom three layers ranged from 0 to 562 g/m^2 for the first 4 days of simulation. The solution scheme was found to be the cause of this problem.

17. Although initial conditions for benthos and sediment were reported as grams per square meter, those values were changed to a concentration (grams per cubic meter) by "dispersing" the variables into the water of the adjacent layer. Since the ratio of the mixture changed, the concentration of the variable changed, becoming much greater in the deeper layers. An implicit integration scheme was used to solve for new concentrations. To solve the stability problem, the units for the variables were changed from grams per cubic meter to grams per layer, and the Euler technique was used to solve for new values. Predictions of sediment for 4 days in the bottom layers for the improved model ranged between [illegible] and [illegible] g/m^2 and were considered satisfactory. Results after corrections to the model are listed in the bottom portion of Table 2.

Conservation of Mass

18. A thorough test for conservation of mass was performed using data from Lake Conway, Florida (Wlosinski 1981). For a conservative substance in the model, such as total dissolved solids, the results were

satisfactory after a 1-year simulation. The balance, which is a comparison of the initial mass plus all positive fluxes of the reservoir boundary with the final mass plus all negative fluxes, was within 1.7 percent. For nonconservative substances, such as phosphorus, the initial results were not satisfactory. In a series of three calibration simulations, the balance for phosphorus was between 4.5 and 147.5 percent (Table 3). The three calibration simulations used exactly the same data set except for the estimates for three coefficients. The algae half-saturation coefficient for phosphorus was varied from 0.005 to 0.003; the algal settling rate, from 0.4 to 0.2; and zooplankton assimilation, from 0.33 to 0.27. The range of these estimates is reasonable and can be found in Jorgensen (1979).

19. The imbalance of mass was caused by three factors. First, the ratios of carbon, nitrogen, and phosphorus were different for different state variables. Although this difference occurs in nature, the model is not complex enough to represent all of the processes in nature needed to account for an exact mass balance. For example, the ratios of carbon, nitrogen, and phosphorus for zooplankton and algae are usually different. When zooplankton eat algae, they do not take on the carbon, nitrogen, and phosphorus ratios of algae, but instead excrete these elements in different ratios. In the original model, when zooplankton ate algae, elements were created or destroyed since algae and zooplankton had different carbon, nitrogen, and phosphorus ratios.

20. Three alternatives were available to correct this problem: (a) the model could have been made more complex to better represent natural processes dealing with the ratio of elements, (b) the assumption could be made that different organic state variables have the same stoichiometric ratio, or (c) the assumption could be made that the problem did not cause significant errors. Because the first alternative would have resulted in a model too complex for the needs of the Corps of Engineers, and because the mass balance was considered significant, the second alternative was chosen. Thus, a simplified assumption has been made in the model that a constant stoichiometric ratio exists between

the elements of carbon, nitrogen, and phosphorus for different organic variables.

21. The second problem causing the mass imbalance was due to the solution scheme. The model solves the equations dealing with each state variable in a sequential manner. In effect, this scheme solves coupled differential equations in an uncoupled manner. The flux between compartments is actually solved twice: once for computations for the donor compartment and once for the receiving compartment. The flux computed by the model can actually be different for the two compartments since a new, updated value for the mass of the donor compartment was used in calculating the flux in the receiving compartment. This problem was not found to be a major factor causing mass imbalance.

22. The third problem caused the majority of the mass imbalance. Under certain conditions, more material was predicted to leave a compartment than was contained in that compartment. On those occasions, the model arbitrarily changed the predicted negative concentration to either zero or a small positive concentration. This, in effect, created mass that was then used by other compartments in the model, just as if the addition entered the reservoir along with the upstream flow. During the Lake Conway application, these arbitrary additions, termed the negative hedge, were totaled in order to assess their significance (Table 3). As can be seen for simulation 3 (original model), the amount of phosphorus added by way of the negative hedge was more than the total initial mass or the total amount in the inflow.

23. The algorithms for those processes which caused the majority of the negative hedge problem were altered so that the maximum amount of material that could leave a compartment was the amount present at the beginning of that time step. The balance for the improved model was 3.1 percent, which compared with 147.5 percent when using the original model with the third data set. The value of mass added by the negative hedge fell from 120,000 kg to only 20 kg. The amount of phosphorus added by way of the negative hedge and the balance percentage were even lower when using the coefficients from simulations 1 and 2 with the improved model.

Other Tests

24. Other tests performed on CE-QUAL-R1 included checking the dimensions of each equation, comparing predictions using different time steps, changing driving variables while making sure predictions were reasonable, and checking to make sure that initial values were supplied for all model variables. Each of these tests pinpointed errors within the model. The majority of errors were easily corrected. Corrections ranged from changing misspelled variable names to replacing algorithms. The more significant changes included:

- a. Replacing an approximate solution for calculating elevation as a function of volume with an exact solution.
- b. Correcting the algorithm for estimating per hour rates from per day rates used in the Euler solution scheme.
- c. Changing the algorithm for interpolating initial conditions.
- d. Correcting algorithms that dealt with the settling of algae and detritus.
- e. Making density a function of dissolved and suspended solids in addition to temperature.

PART IV: EVALUATION OF MODEL PREDICTIONS

Original Model

25. Work reported in this section of the report commenced after improvements from PART III were made to the model and after satisfactory thermal profiles were predicted for DeGray Lake (Johnson and Ford 1981). The work of Johnson and Ford provided temperature predictions (from CE-THERM-R1, the thermal analysis section of CE-QUAL-R1) that had an average RI of 1.11.

26. Variables for which data were available from DeGray in 1979 and 1980 were algae, zooplankton, dissolved organic matter, PO4-P, NH4-N, NO2-N + NO3-N, oxygen, pH, alkalinity, and TDS. In addition, data for inorganic carbon were available for 1979. Two different estimates for algae were available for both years. One estimate was based on dry weight values in which zooplankton were handpicked from a grab sample with the sample then being dried. The other estimate was based on chlorophyll a data. For 1979 and 1980, the dry weight data averaged 2.27 and 1.68 g/m^3, respectively. Values estimated from the chlorophyll data, using the average concentration and a conversion value from Spangler (1969), were 0.56 and 0.29 g/m^3. Although the dry weight data were used initially, estimates for the dry weight may have been high due to detritus incorporated in the samples.* For this reason, and since more chlorophyll a data were available, final comparisons were made using the chlorophyll a estimates.

27. Results for 1979 obtained from the original model, with corrections as described in Part III, are presented in Table 4 and Figure 1. These results were obtained after a number of calibration simulations were completed. The graphs in Figure 1 also contain the results after all improvements were made to the model (final model). (These

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* Personal Communication, January 1982, R. H. Kennedy, Research Limnologist, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

improvements are described later in this section.) In those cases where the predictions from the original and final models were similar, predictions from only one are presented. If the predictions are not similar, the solid line represents predictions from the final model and the dashed line represents predictions from the original model. Although graphs were obtained for all variables for a number of days when measured data were available, only those graphs viewed at best and worst cases (as determined by the RI) are presented. The observed and predicted means as well as the RI are presented in Table 4. The statistics presented were calculated over all depths and time periods.

28. Examination of results, from the original model, showed that the predicted PO4-P and NH4-N values were not at all satisfactory, especially in the hypolimnion during the latter months of the year. This, in turn, caused high predictions for algae and inorganic carbon in the epilimnion as the mixed layer became deeper in the fall. This problem persisted through all calibration simulations, indicating that the model structure probably was not correct. Results obtained for the 1980 confirmation data set also showed high predictions for phosphorus and nitrogen. Results for the confirmation data sets are presented in Figure 2 and Table 5. The format is the same as for the 1979 data set.

29. Further attempts to calibrate the model did not produce better results. At this point, the decision was made to change the structure and algorithms of the model to see if results could be improved. Any changes that simplified the model would be accepted even if the results were not significantly better. Changes that made the model more complex, and therefore harder to use, would only be accepted if they produced significantly better results.

Collapsing Compartments

30. The first changes that were made attempted to simplify the model. Changes were made one at a time, after which graphic and statistical analyses were performed with the results of the 1979 data set.

31. Three changes were made that simplified the model:

a. Three fish compartments were united to form one compartment.

b. The benthos and sediment compartments were united.

c. Nitrite and nitrate-nitrogen compartments were combined to form one compartment.

32. Diagrams of the new model structure which incorporated these changes are presented as Figures 3-5. Graphic comparisons of all variables after each change appear to be nearly identical to the graphs after final calibration. Only slight differences, before and after combining variables, were noted in the RI, and the overall average of 3.43 for all variables was maintained. All coefficients remained the same except those directly involved in combining variables. After all changes were made, the 1980 confirmation data set was again used to simulate DeGray Lake. As happened for the 1979 data set, graphs for all variables appear to be nearly identical when compared with the confirmation simulation after final calibration. The overall RI was slightly worse, going from 3.49 to 3.56. Because the predictions were nearly the same before and after the changes, and since the simplified version used 35 fewer coefficients, the changes were made permanent.

Adsorption of Phosphorus and Nitrogen

33. The process of adsorption, by which materials in the soluble phase adhere to the surface of solids, was not included in the original model. Since the net effect of this process would be to remove nitrogen and phosphorus from the water column, where predictions were high, the process was programmed and evaluated in CE-QUAL-R1. The first algorithm had a constant amount of phosphorus and nitrogen adsorbed per gram of suspended solids, which included detritus, algae, and suspended solids. The phosphorus and nitrogen were moved to the sediment or to next lower layer, depending on the average settling rate of the solids.

$$A = \frac{VK_a\left(C_s + C_d + C_{a1} + C_{a2}\right)\left(\frac{S_s + S_d + S_{a1} + S_{a2}}{4}\right)}{T} \qquad (1)$$

where

A = amount of nutrient settled from a layer due to adsorption (g/layer/time step)

V = volume of water in the layer (m^3/layer)

K_a = coefficient representing the amount of nutrient adsorbed per unit of suspended solids $\left(\frac{\text{g nutrient}/m^3}{\text{g solids}/m^3}\right)$

C_s, C_d, C_{a1}, and C_{a2} = the concentration of suspended solids, detritus, and the two algal compartments (g/m^3)

S_s, S_d, S_{a1}, and S_{a2} = the settling rate of the above compartments (m/time step)

T = the layer thickness (m)

34. There were problems with this formulation because it allowed most of the inorganic nutrients to be settled in layers with low nutrient concentrations, while at the same time not having the desired effect on layers with high nutrient concentrations. To resolve this problem, the coefficient K_a in Equation 1 was made a function of the nutrient concentration (after Hwang, Lackie, and Huang 1976).

$$K_a = \frac{NK_m}{\frac{1}{K_d} + N} \qquad (2)$$

where

N = inorganic nutrient concentration (g/m^3)

K_m = maximum amount of solute per amount of solids (g nutrient/g solids)

K_d = adsorption coefficient [1/(time step g/m^3)] divided by the desorption coefficient (1/time step)

35. Variable K_d was read in as a single coefficient since equilibrium concentrations were assumed. Equation 2 is known as the Langmuir isotherm, which has been used to describe nutrient adsorption (Ku, Di Giano, and Feng 1978). This formulation noticeably improved results and was therefore considered satisfactory.

Addition of Refractory Dissolved Organics

36. The original model included one variable for dissolved organic matter. Input to this compartment was from upstream flow, while output included decomposition and flow out of the system. Maximum decay was specified by a coefficient and reduced as a function of temperature. This representation for decomposition of dissolved organic matter was too simple. The dissolved organic matter compartment in a reservoir actually consists of a number of compounds that decompose at varying rates. Rates near 0.4/day have been measured for labile compounds, and near 0.004/day for refractory compounds.

37. Many of the labile compounds in a reservoir come from algae through processes of mortality and respiration. Materials coming from upstream usually have been undergoing decomposition in the river and are more refractory. To better represent these processes, two dissolved organic matter compartments were included in the model: one representing refractory organic compounds and the other representing labile compounds. Each of the compartments has a different decomposition rate. As the labile compartment decays, some of the products go to the inorganic nutrients and some to the refractory organic compartment. A diagram of these compartments is included as Figure 6. These changes improved model predictions.

Inflow Modifications

38. CE-QUAL-R1, being one-dimensional, does not allow the model to predict variations as one moves from the headwater to the damsite of a reservoir. This could cause problems, because the concentrations of inflowing constituents are usually measured at or above the headwater area, and the model's predictions are best suited near the deepest part of the pool, which usually occurs near the dam. Any processes occurring between the headwater and dam which can change the concentrations of inflowing constituents would not be represented and can lead to erroneous results. Since phosphorus and nitrogen can be taken up by phytoplankton

or adsorbed to particulate materials and settled to the headwater bottom, the concentration of inorganic nutrients entering the main part of the reservoir may have been lower than used for the DeGray simulations. To demonstrate the effect this might have had on the high concentration of phosphorus and nitrogen in the hypolimnion as predicted by the model, the concentration of nutrients in the inflow was lowered by 70 percent and 100 percent. This change had virtually no effect on the high hypolimnetic concentrations of phosphorus and nitrogen, but did have an adverse effect on the prediction of algae in the spring in the epilimnion. For this reason no permanent change was made to the model concerning inflowing concentrations of nutrients.

Phytoplankton Modifications

39. The Monod equation for photosynthesis as a function of light was replaced with Steele's (1962) light equation.

$$F = \frac{I}{K_s} e^{[1-(I/K_s)]} \tag{3}$$

where

F = fraction of maximum photosynthesis

I = average light for a particular layer (kcal/m^2/hr)

K_s = Steele's light saturation coefficient or the amount of light (kcal/m^2/hr) at maximum photosynthesis

Steele's equation is more widely accepted and can represent photoinhibition at irradiance levels greater than the light saturation (K_s) level.

40. Loss terms for photorespiration, or excretion, and mortality were also added to the phytoplankton compartment. Photorespiration results from the oxidation of ribulose diphosphate instead of its carboxylation to yield glycolate. This process has been shown to be most sensitive to low and high irradiance levels and can be represented by the function

$$E = K_e \; (1. - F) \qquad (4)$$

where

E = fraction of the compartment lost to excretion (per time step)

K_e = maximum excretion rate (per time step)

and F is calculated in Equation 3.

Photorespiration rates increase at both very high and very low intensities. Extracellular release of photoassimilated carbon can range from a baseline of 2 percent to as high as 40 percent.

41. Another change dealt with the products of algal respiration. Based on constant stoichiometry of algae, products from total respiration were fractioned into the compartments of phosphorus, inorganic carbon, and ammonia. Thus, the respired biomass was again immediately available for use by the algae. In actuality, this cycling scheme is erroneous and can create problems for phosphorus and ammonia dynamics. The major products of respiration are carbon dioxide and organic compounds. These organic compounds are later remineralized into readily available forms of nitrogen, phosphorus, and inorganic carbon. To represent this process correctly, the products of algal respiration should be carbon dioxide and labile dissolved organics. This would alleviate the problem of immediate recycling, since dissolved organics decay at a slower rate. Unfortunately, this can cause a mass balance problem for carbon because of the model simplification of constant stoichiometry. In this case, the same carbon would be released twice, once as respired carbon dioxide and once when dissolved organic matter decomposes. In order to maintain a continuity of mass and to slow the immediate recycling of nutrients, the products of photorespiration increase the labile dissolved organic matter compartment, while those from dark respiration will continue to increase the NH4-N, inorganic carbon, and PO4-P compartments.

42. The mortality term added to the algae compartment represents a loss rate due to the senescence of algae. It is a difficult parameter to measure in the field, but is generally regarded as being less than

10 percent of the total loss terms. This rate is accelerated by critically high temperatures and can be simulated by the equation

$$D = K_t \, e^{(T - T_m)} \tag{5}$$

where

D = fraction of the compartment that dies (per time step)

K_t = maximum mortality fraction (per time step)

T = layer temperature (^{o}C)

T_m = temperature at which total mortality occurs (^{o}C)

Mortality is fractioned between the detritus and labile dissolved organic matter compartments.

43. In the past, no photosynthesis was allowed to occur below the 1-percent light level. This is a somewhat arbitrary standard that indicates the depth where only 1 percent of the incident irradiance is penetrating from the surface. This has been referred to as the compensation depth, a point where phytoplankton respiration exceeds photosynthesis. Photosynthesis does not stop here, however. Futhermore, shade-adapted species are known to acclimate to low irradiance levels by reducing their respiration rates, thereby increasing the photosynthesis/respiration ratio compensation level. This can be very important in some systems and under conditions of stratification. The elimination of the condition has been tested in the model under the assumption that respiration processes will balance out with reduced photosynthetic ability. The combined changes to the algal subroutine produced improved predictions. All of the structural changes to the phytoplankton compartment are shown in Figure 7.

Fluxes

44. Initial calibration of CE-QUAL-R1 for DeGray in 1979 started with coefficients, estimated by Johnson and Ford (1981), for the thermal model CE-THERM-R1 and textbook values for biological and chemical

coefficients. The initial simulation showed decreases in the oxygen concentrations in the metalimnion and the hypolimnion, although at a faster rate than observations indicated. Instead of arbitrarily changing coefficients until satisfactory concentrations were predicted, the fluxes predicted by the model were compared with field measurements or literature values. Although flux information from the model was available on a per layer basis, the study concentrated on fluxes at the reservoir level to search for gross discrepancies.

45. At the time the flux information was being used to help calibrate the 1979 data set, there were 3 processes, on a reservoir basis, that could increase oxygen concentrations and 13 processes that could decrease oxygen concentrations (Table 1). Of the 13 that resulted in losses, 3 processes accounted for 80 percent of the oxygen loss. The model predicted that 40 percent of the oxygen loss was used in algal respiration, 29 percent was lost in the decomposition of dissolved organic matter, and 11 percent was due to the decomposition of sediments. In addition, algal respiration accounted for 62 percent of primary production. Carbon primary production data were available for DeGray in 1979.* The samples were collected once per month and reported as milligrams of carbon per square meter per hour. Assuming constant values for the day and month, primary productivity would be approximately 4×10^6 kg carbon for the reservoir for the simulation period. The model value for the period was 1.5×10^7 kg of carbon, which is approximately 3.7 times the measured value. In addition, Whittaker's (1975) general figure for algal respiration of 30 to 40 percent of gross primary production indicates the model prediction of 62 percent was high.

46. No data were available for DeGray Lake concerning decomposition of dissolved organic matter or sediments. In studies on other reservoirs, 58 to 176 mg oxygen/m^2/day were utilized by the sediments (Gunnison, Chen, and Brannon 1983). The initial value predicted by the model was 475 mg oxygen/m^2/day. Since the major process concerning dissolved organic matter was decomposition and since predicted

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* Personal Communication, R. H. Kennedy, op. cit.

concentrations were low, the decomposition coefficient was probably high and was therefore lowered. Although collected in 1980, sediment trap data were also available for DeGray Lake. This information gave an indication of the amount of algae settling at three depths: 5, 15, and 45 m.* Data were collected at approximately monthly intervals for six periods between February and August and were reported as milligrams chlorophyll a settling per square meter per day. Assuming the average rate for that period remained constant for the entire simulation, and using Spangler's (1969) conversion factor of 0.23 g/m^3 dry weight equals milligrams of chlorophyll a per cubic meter, the algal mass settling at these depths was calculated. The figures were 3.8×10^5, 3.4×10^5, and 1.0×10^4 kg/reservoir/339 days for the depths of 5, 15, and 45 m, respectively. Corresponding predictions were 4.2×10^6, 9.8×10^5, and 1.8×10^4, respectively.

47. With this evidence in mind, coefficients dealing with algal production, respiration and settling, and sediment and dissolved organic matter decomposition were reduced in order to bring model predictions in line with measured flux values. During the ensuing calibration simulations, as the fluxes were brought more in line with measured values, the oxygen concentrations also improved. The predicted flux values for the beginning and ending of the calibration exercise are listed in Table 6. Predicted fluxes for primary production, algal respiration, and sediment oxygen demand were near measured values. For algal settling at 5 and 15 m, predictions were not as good as the other fluxes, but did show improvement over the initial simulations. Since predicted settling at 5 m was higher and at 15 m was lower than measured values, predictions were considered satisfactory. The predicted value for algal settling at 45 m was excellent.

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* Personal Communication, January 1982, W. F. James, Physical Scientist, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

PART V: CONCLUSIONS

48. CE-QUAL-R1 was evaluated with data collected at DeGray Lake, Ark. Data collected in 1979 were used for calibration, while data collected in 1980 were used for confirmation. Evaluation consisted of tests of the code and comparison of measured values to model predictions. Tests to evaluate the software pinpointed a number of errors in the original model. Corrections ranged from changing misspelled variable names to replacing algorithms or changing part of the solution scheme.

49. Evaluation of output from the original model showed that predicted ortho-P and ammonia-nitrogen values were not at all satisfactory, especially in the hypolimnion during the latter months of the year. The problem persisted through all calibration and confirmation simulations, indicating that the model structure may not have been correct. A number of changes to algorithms, processes, and compartments were programmed and tested in order to simplify the model or improve predictions. Changes included uniting some compartments, adding a dissolved refractory organic compartment, adding the process of adsorption, and changing algorithms dealing with phytoplankton. The model has been improved in that it requires 22 fewer coefficients, while predictions more closely match measured values, especially for ortho-P and ammonia-nitrogen. For the confirmation simulations for which 3,536 comparisons were made, the average value for the Reliability Index improved from 3.49 to 2.59. Graphs of model output before (original model) and after revisions (final model) are shown in Figures 1 and 2.

50. Model changes based on the results of this and other studies are being incorporated in a new version of the CE-QUAL-R1 User's Manual. Coefficients for the final simulations are listed in Appendix A; Appendix B presents the initial values of state variables. Complete data sets for 1979 and 1980 can be found in Appendixes C and D, respectively.

REFERENCES

Bohan, J. P., and Grace, J. L., Jr. 1973. "Selective Withdrawal from Man-Made Lakes," Technical Report H-73-4, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Environmental Laboratory. 1982a. "CE-QUAL-R1: A Numerical One-Dimensional Model of Reservoir Water Quality; User's Manual," Instruction Report E-82-1, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

__________. 1982b. "CE-QUAL-R1: A Numerical One-Dimensional Model of Reservoir Water Quality; User's Manual," Instruction Report E-82-1 (rev. ed., supersedes Instruction Report E-82-1, April 1982), US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Gunnison, D., Chen, R. L., and Brannon, J. M. 1983. "Relationship of Materials in Flooded Soils and Sediments to the Water Quality of Reservoirs - I, Oxygen Consumption Rates," Water Research, Vol 17, pp 1609-1617.

Hwang, C. P., Lackie, T. H., and Huang, P. M. 1976. "Adsorption of Inorganic Phosphorus by Lake Sediments," Journal of the Water Pollution Control Federation, Vol 48, pp 2754-2760.

Johnson, L. S., and Ford, D. E. 1981. "Verification of a One-Dimensional Reservoir Thermal Model," paper presented at the American Society of Civil Engineers 1981 Meeting, St. Louis, Mo.

Jorgensen, S. E. 1979. Handbook of Environmental Data and Ecological Parameters, Pergamon Press, Oxford.

Ku, W. C., Di Giano, F. A., and Feng, T. H. 1978. "Factors Affecting Phosphate Adsorption Equilibria in Lake Sediments," Water Research, Vol 12, pp 1069-1074.

Lawler, J. P. 1980. "Modeling Framework and Software Validation," Workshop on Verification of Water Quality Models, EPA-600/9-80-016, US Environmental Protection Agency, Environmental Research Laboratory, Athens, Ga.

Leggett, R. W., and Williams, L. R. 1981. "A Reliability Index for Models," Ecological Modelling, Vol 13, pp 303-312.

Mihram, G. A. 1972. "Some Practical Aspects of the Verification and Validation of Simulation Models," Operational Research Quarterly, Vol 23, No. 1, pp 17-29.

Perrier, E. R., Harris, J., and Ford, B. 1977. "A Comparison of Deterministic Mathematical Watershed Models," paper presented at the 1977 Annual Meeting of American Society of Agricultural Engineers, St. Joseph, Mich.

Spangler, F. L. 1969. "Chlorophyll and Carotenoid Distribution and Phytoplankton Ecology in Keystone Reservoir, Tulsa, Oklahoma," Ph.D. Dissertation, Oklahoma State University, Stillwater, Okla.

Steele, J. H. 1962. "Environmental Control of Photosynthesis in the Sea," Limnology and Oceanography, Vol 7, pp 137-150.

Thornton, K. W., Kennedy, R. H., Carroll, J. H., Walker, W. W., Gunkel, R. C., and Ashby, S. 1980. "Reservoir Sedimentation and Water Quality--An Heuristic Model," Symposium on Surface Water Impoundments, American Society of Civil Engineers, 2-5 June 1980, Minneapolis, Minn.

US Environmental Protection Agency. 1980. "Workshop on Verification of Water Quality Models," EPA-600/9-80-016, Environmental Research Laboratory, Athens, Ga.

Whittaker, R. H. 1975. Communities and Ecosystems, MacMillan Publishing Co., New York.

Wlosinski, J. H. 1981. "Evaluation of the Model CE-QUAL-R1 for Use by the Aquatic Plant Control Research Program," Technical Report A-81-6, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

__________. 1984. "Evaluation Techniques for CE-QUAL-R1: A One-Dimensional Reservoir Water Quality Model," Miscellaneous Paper E-84-1, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

__________. 1985. "Flux Use for Calibrating and Verifying Models" in press, Journal of Environmental Engineering, American Society of Civil Engineers.

Wlosinski, J. H., and Collins, C. D. 1985. "Confirmation of the Water Quality Model CE-QUAL-R1 Using Data from Eau Galle Reservoir, Wisconsin," Technical Report in preparation, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Zimmerman, M. J. 1985. "Initial Evaluation of a Computer Algorithm for Simulating Anaerobic Conditions in Reservoirs," Miscellaneous Paper in preparation, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Table 1

Process Interactions for Variables in CE-QUAL-R1, Original Version (Environmental Laboratory 1982a)

From \ To	Algae 1	Algae 2	Alkalinity	DOM	NH4-N	NO2-N	NO3-N	Coliform	Detritus	Oxygen	PO4-P	TDS	SS	Zooplankton	Inorganic carbon	Benthos	Sediment	Fish-1	Fish-2	Fish-3	Surface	Downstream
Algae 1	Y				R					P	R			I	R		S		I			O
Algae 2		Y			R					P	R			I	R		S		I			O
Alkalinity			F																			O
DOM				F	D						D				D							O
NH4-N	P	P			F	D																O
NO2-N						F	D															O
NO3-N	P	P					F															O
Coliform								F														O
Detritus					D				Y		D			I	D		S		I			O
Oxygen	R	R		D	D	D			D	F				R		R	D	R	R	R	X	O
PO4-P	P	P									F											O
TDS												F										O
SS													Y									O
Zooplankton					R				Z		R			F	R				I			O
Inorganic carbon	P	P													F						X	O
Benthos					R						R				R	G	Z			I	G	
Sediment					D						D				D	I	G			I	G	
Fish-1					R						R				R		Z				H	
Fish-2					R						R				R		Z	I			H	
Fish-3					R						R				R		Z	I			H	
Surface										X					X	G	G					
Upstream	W	W	W	W	W	W	W	W	W	W	W	W	W		W							

* Definitions of abbreviations are as follows:

D = Decay or decomposition
DOM = Dissolved organic matter
E = Egestion
F = Diffusion and convection
G = Gain or loss caused by layer depth change
H = Fishing harvest
I = Ingestion
N = Nonpredatory mortality
O = Outflow
P = Photosynthesis
R = Respiration
S = Settling
SS = Suspended solids
TDS = Total dissolved solids
W = Inflow
X = Exchange at the air-water interface
Y = Settling, diffusion and convection
Z = Egestion and nonpredatory mortality

Table 2

Sediment Prediction (g/m^2)

Layer	Simulation Day 0	1	2	3	4
		Original Model			
3	10.0	9.6	10.2	10.1	7.5
2	10.0	34.2	14.4	562.5	0.0
1 (bottom)	10.0	15.9	6.6	260.5	0.0
		Improved Model			
3	10.0	10.4	10.8	11.2	11.3
2	10.0	10.3	10.7	11.0	11.1
1	10.0	10.2	10.6	10.6	10.7

Table 3

Results of the Mass Balance Study

		Simulation			
		1	2	3	
	Units	Original Model	Original Model	Original Model	Model with Mass Balance Improvements
Algae P half-saturation coefficient	mg/ℓ	0.005	0.004	0.003	0.003
Algae settling rate	m/day	0.4	0.3	0.2	0.2
Zooplankton assimilation rate	1/day	0.33	0.30	0.27	0.27
Initial P mass	kg/lake	0.72×10^5	0.72×10^5	0.72×10^5	0.72×10^5
Total P inflow	kg/lake/348 days	0.71×10^3	0.71×10^3	0.71×10^3	0.71×10^3
Total P outflow	kg/lake/348 days	0.0	0.0	0.0	0.0
Final P mass	kg/lake	0.76×10^5	0.97×10^5	0.18×10^6	0.75×10^5
P negative hedge	kg/lake/348 days	0.68×10^3	0.25×10^5	0.12×10^6	0.20×10^2
Balance	percent	4.5	33.4	147.5	3.1

Table 4

Statistical Results from the Calibration Simulations of DeGray Lake, 1979

Variable	Number of Comparisons	Observed Mean	Predicted Mean		Reliability Index	
			Original Model	Final Model	Original Model	Final Model
DOM (mg/ℓ)	295	9.97	9.17	8.61	1.42	1.52
Algae (mg/ℓ)	225	0.56	2.03	0.33	-	2.30
Zooplankton (mg/ℓ)	93	0.021	0.002	0.001	4.76	5.75
PO4-P (mg/ℓ)	326	0.002	0.026	0.006	7.26	4.08
NH4-N (mg/ℓ)	282	0.019	0.122	0.046	10.3	7.33
NO2-N + NO3-N (mg/ℓ)	343	0.178	0.298	0.292	2.98	2.87
Inorganic carbon (mg/ℓ)	353	9.38	7.88	6.49	1.77	1.62
Oxygen (mg/ℓ)	805	7.03	7.58	7.36	1.37	1.42
pH	376	6.54	6.91	6.88	1.10	1.07
Alkalinity (mg/ℓ)	353	15.9	18.1	18.1	1.29	1.29
TDS (mg/ℓ)	304	43.7	60.4	60.8	2.01	2.02
Average					3.43	2.84

Table 5

Statistical Results from the Confirmation Simulation of DeGray Lake, 1980

Variable	Number of Comparisons	Observed Mean	Predicted Mean		Reliability Index	
			Original Model	Final Model	Original Model	Final Model
DOM (mg/ℓ)	268	11.0	9.24	8.02	1.59	1.67
Algae (mg/ℓ)	207	0.29	1.93	0.29	-	2.18
Zooplankton (mg/ℓ)	30	0.014	0.001	0.001	4.56	4.56
PO4-P (mg/ℓ)	308	0.001	0.024	0.002	10.7	4.59
NH4-N (mg/ℓ)	308	0.032	0.111	0.047	4.90	3.38
NO2-N + NO3-N (mg/ℓ)	307	0.137	0.23	0.235	3.09	2.90
Oxygen (mg/ℓ)	910	6.16	7.85	7.78	1.85	1.89
pH	606	6.66	7.18	7.06	1.10	1.09
Alkalinity (mg/ℓ)	308	16.3	23.0	23.1	1.44	1.44
TDS (mg/ℓ)	284	30.9	20.7	19.2	2.15	2.21
Average					3.49	2.59

Table 6

Flux Comparisons of Initial and Final Simulations to Measured Values

Process	Units	Measured Value	Initial Simulation	Final Simulation
Primary production	kg carbon/reservoir/339 days	4.0×10^6	1.5×10^7	4.6×10^6
Algal respiration	percent of production	30-40	62	37
Sediment oxygen demand	mg O_2/m^2/day	58-176	475	141
Algal settling at 5 m	kg/reservoir/339 days	3.8×10^5	4.2×10^6	1.6×10^6
Algal settling at 15 m	kg/reservoir/339 days	3.4×10^5	9.8×10^5	2.9×10^5
Algal settling at 45 m	kg/reservoir/339 days	1.0×10^4	1.8×10^4	1.2×10^4

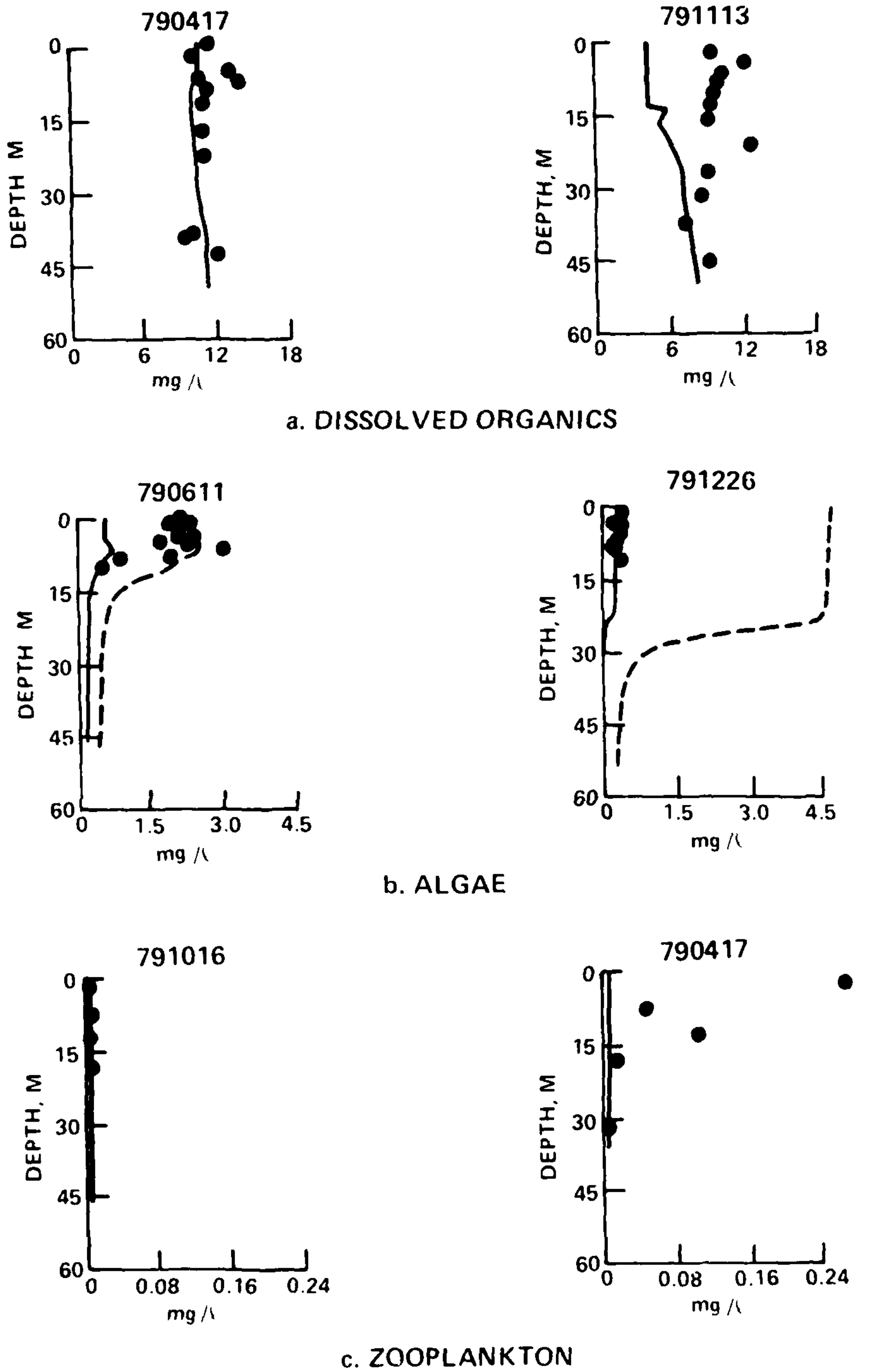


Figure 1. Model predictions versus measured values (circles) for DeGray Lake in 1979. The dashed line represents predictions from the original model; the solid line represents those from the final model (Sheet 1 of 4)

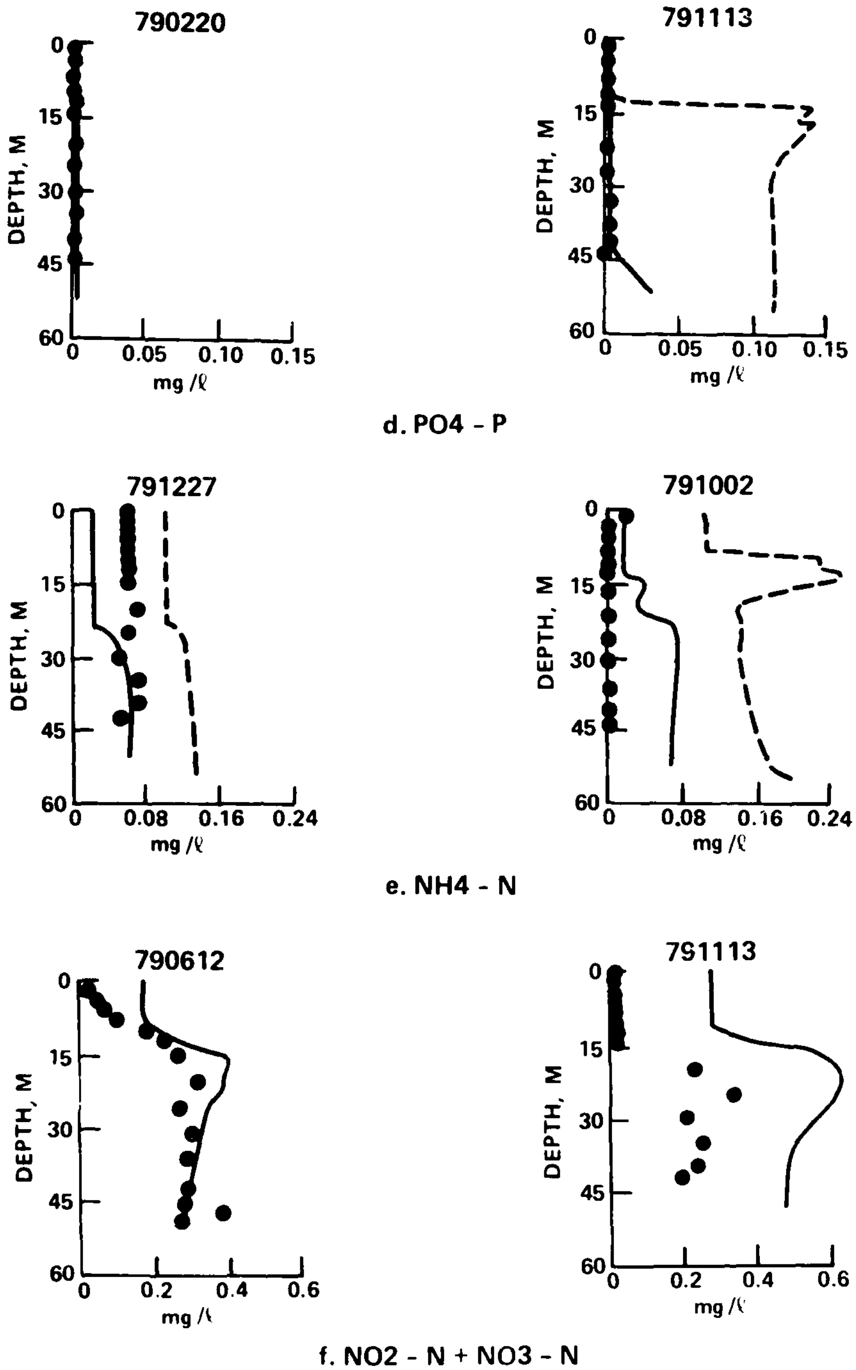


Figure 1. (Sheet 2 of 4)

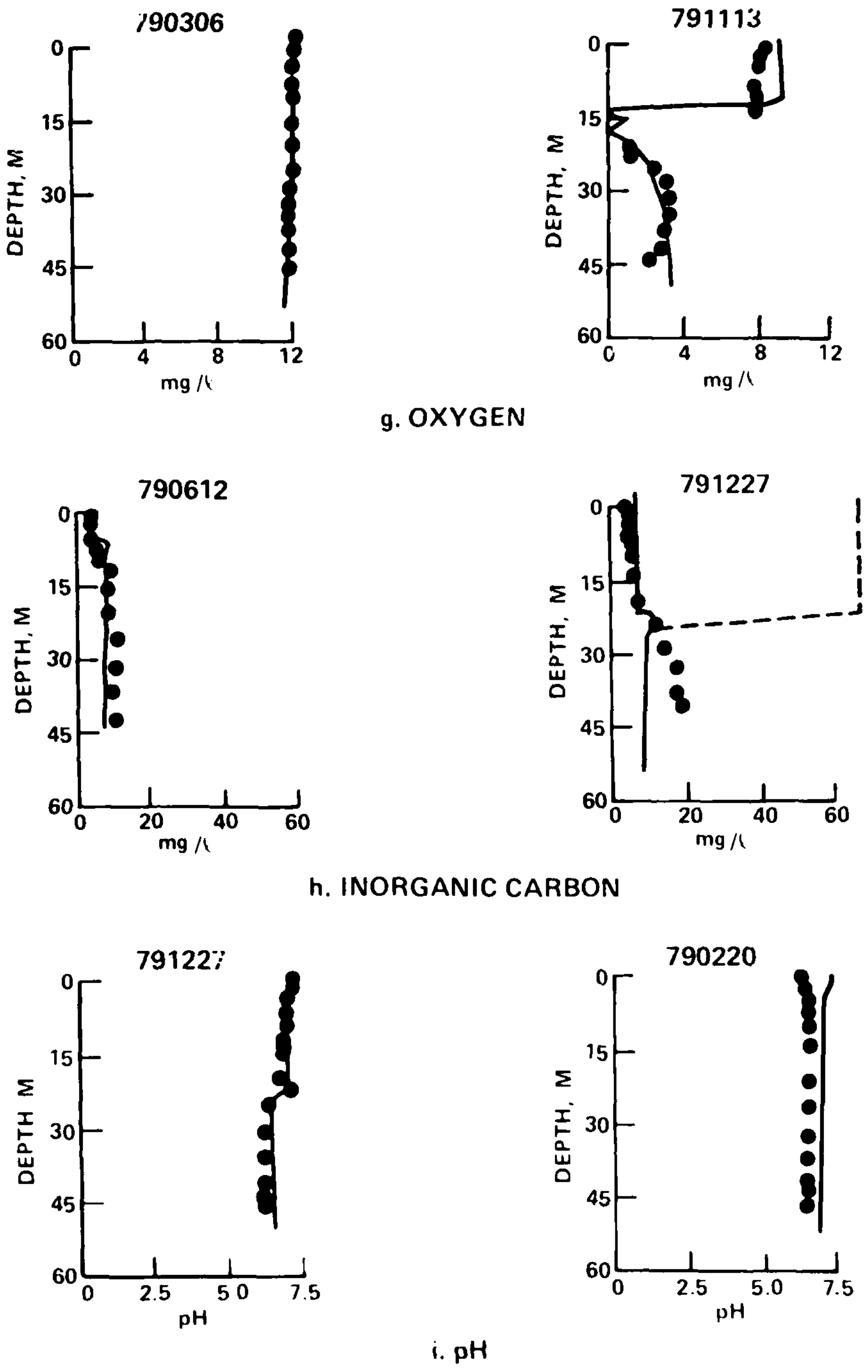
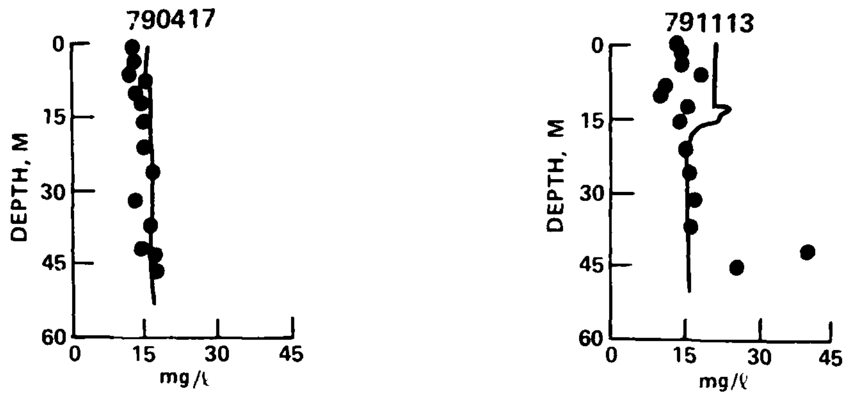
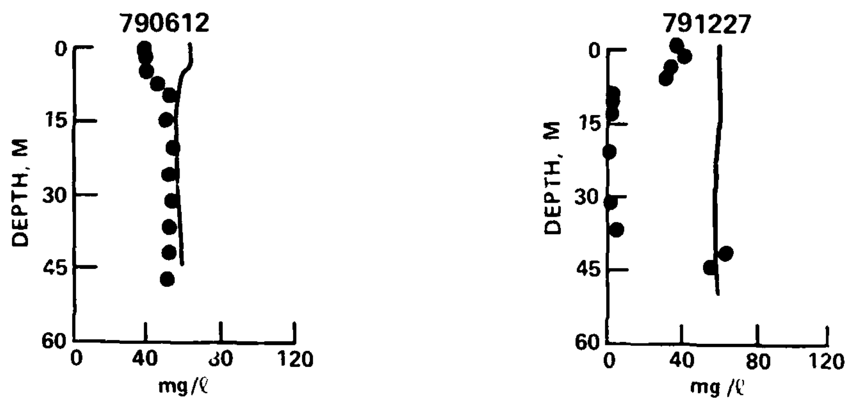


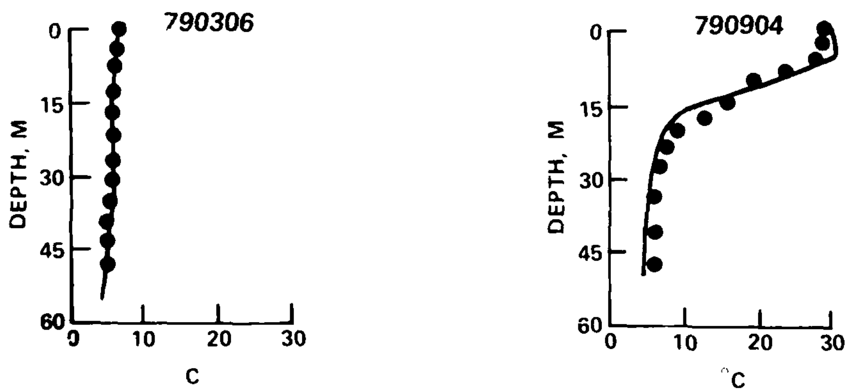
Figure 1. (Sheet 3 of 4)



j. ALKALINITY



k. TOTAL DISSOLVED SOLIDS



l. TEMPERATURE

Figure 1. (Sheet 4 of 4)

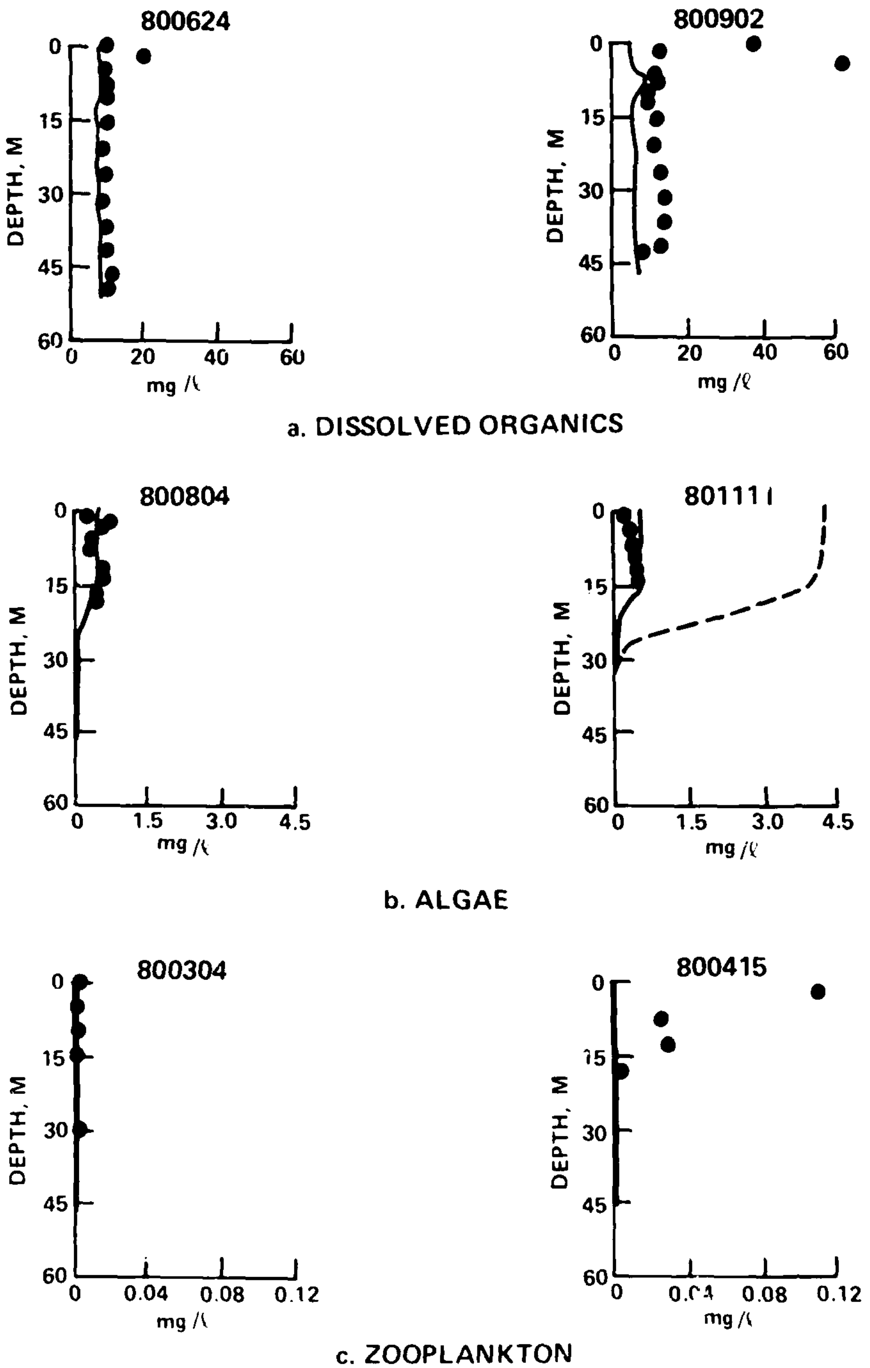
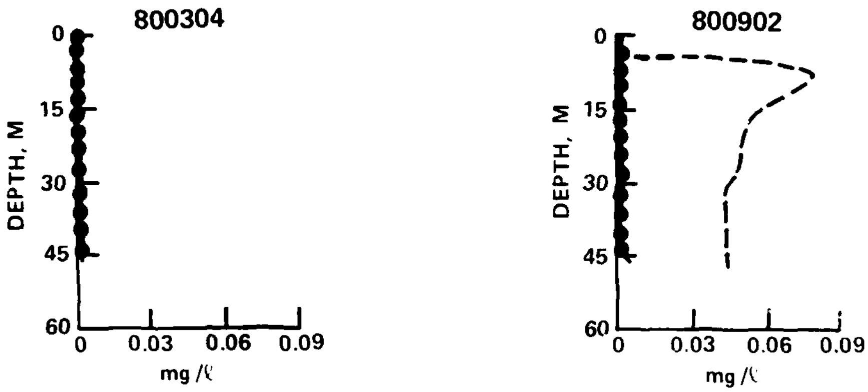
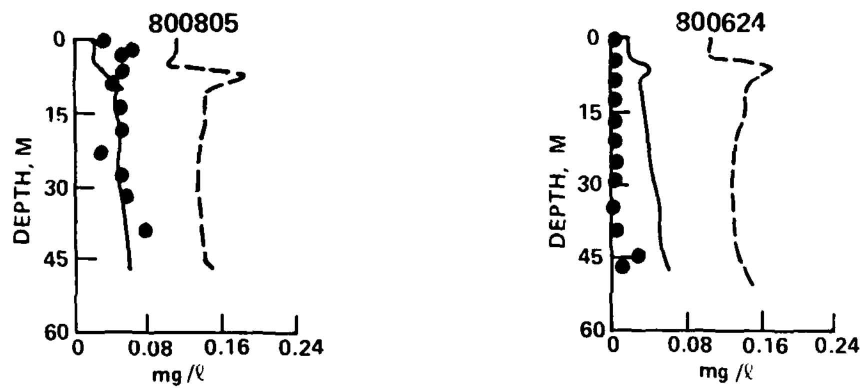


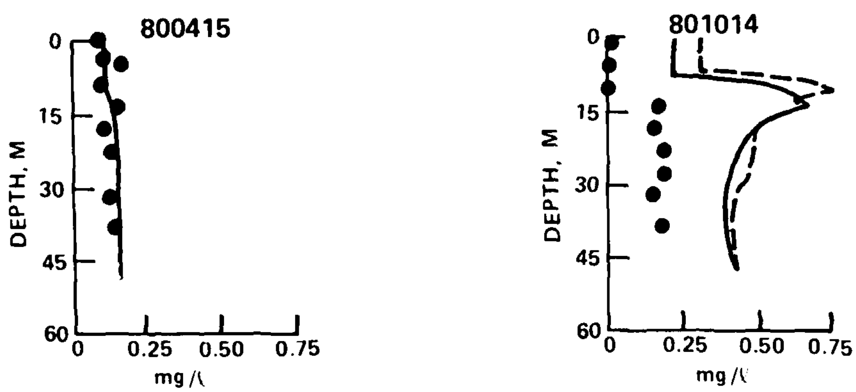
Figure 2. Model predictions versus measured values (circles) for DeGray Lake in 1980. The dashed line represents predictions from the original model; the solid line represents those from the final model (Sheet 1 of 4)



d. PO4-P

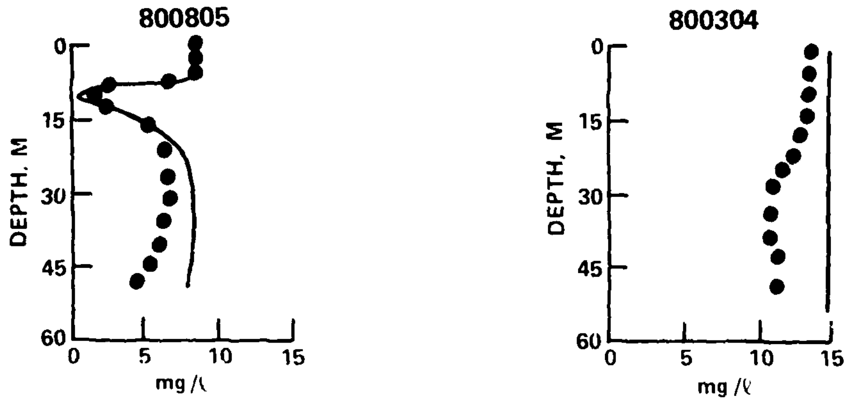


e. NH4-N

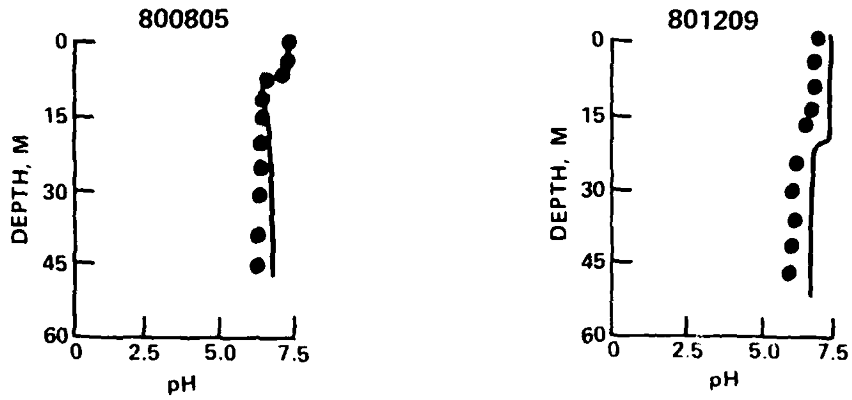


f. NO2-N + NO3-N

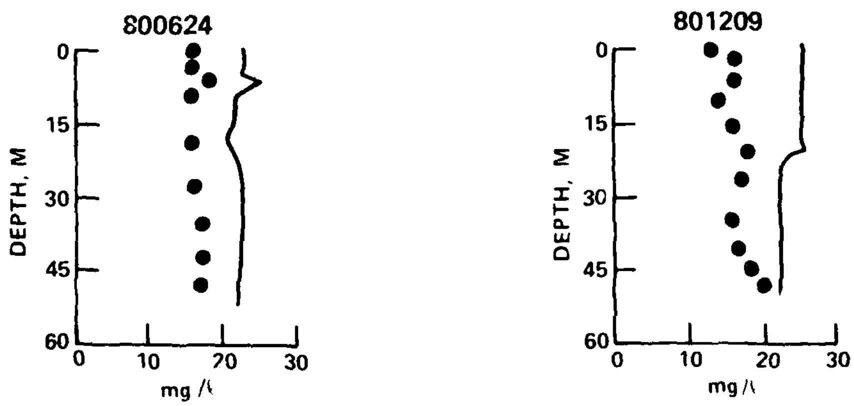
Figure 2. (Sheet 2 of 4)



g. OXYGEN

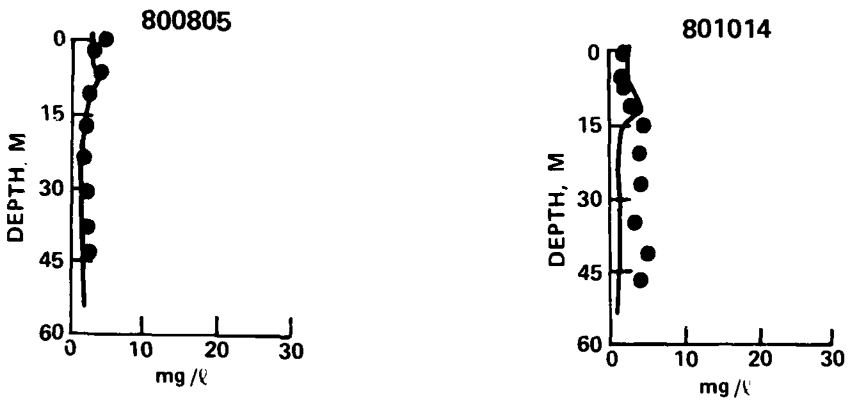


h. pH

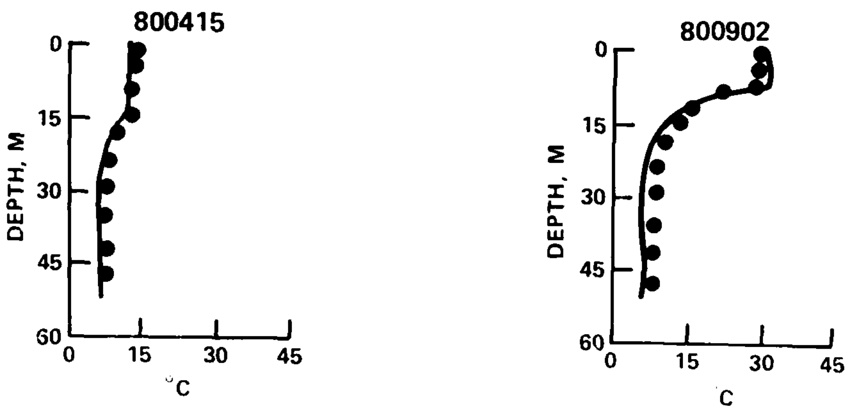


i. ALKALINITY

Figure 2. (Sheet 3 of 4)



j. DISSOLVED SOLIDS



k. TEMPERATURE

Figure 2. (Sheet 4 of 4)

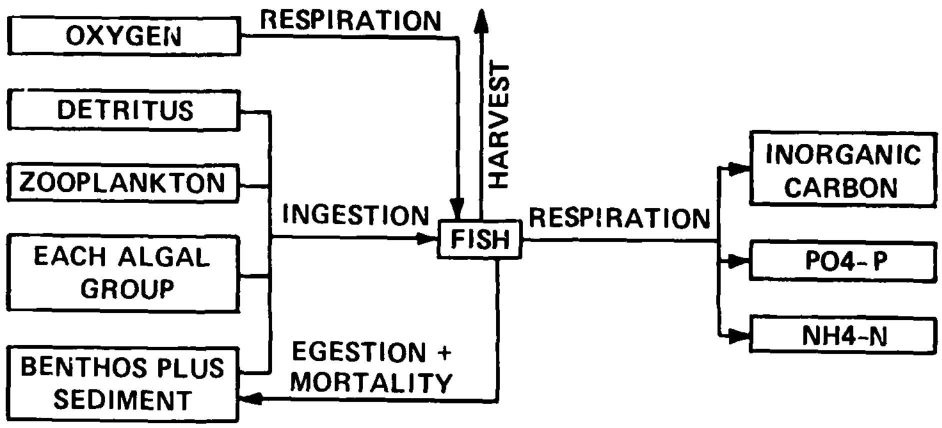


Figure 3. Interaction of fish with other compartments after model improvements

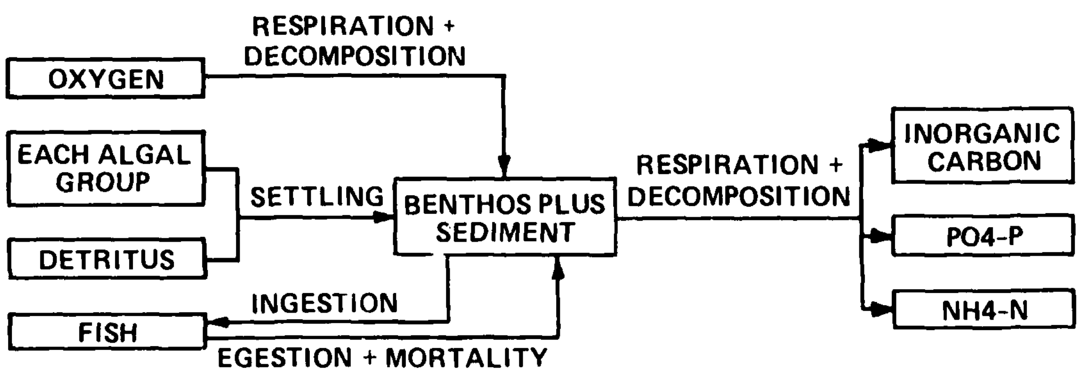


Figure 4. Interaction of benthos plus sediment with other compartments after model improvements

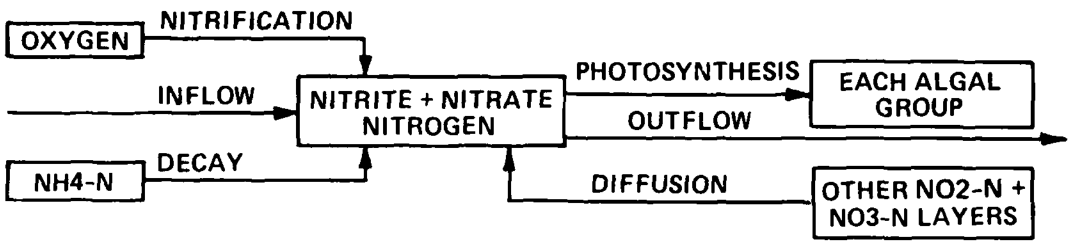


Figure 5. Interaction of nitrite plus nitrate-nitrogen with other compartments after model improvements

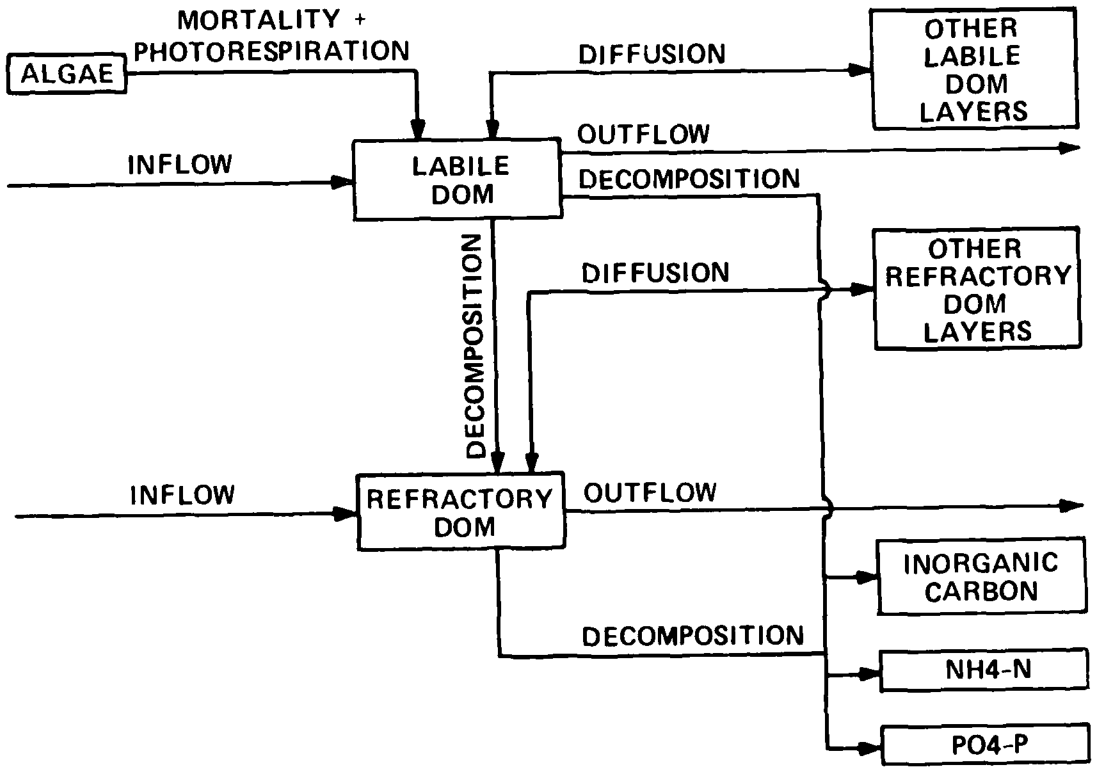


Figure 6. Interaction of the two dissolved organic matter compartments with other variables after model improvements

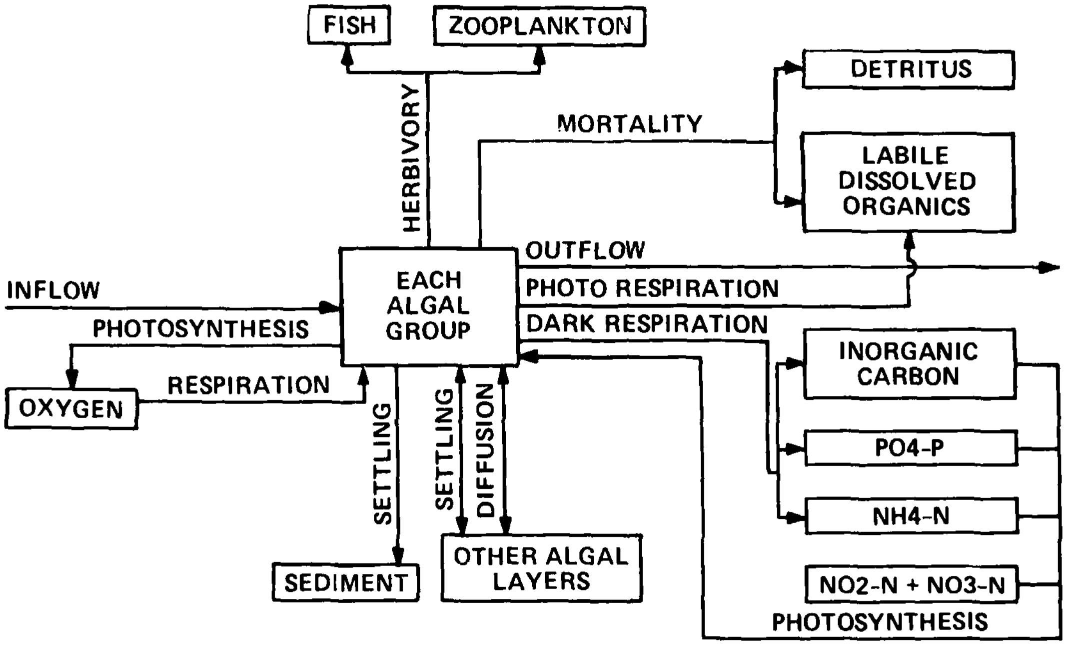


Figure 7. Interaction of each algal group with other compartments after model improvements

APPENDIX A: COEFFICIENTS USED FOR THE FINAL 1979 AND 1980 DEGRAY SIMULATIONS

Parameter	Model Acronym	Units	Value
Reservoir description			
Number of outlets	NOUTS		3
Number of tributaries	NTRIBS		2
Latitude	XLAT		34.2
Longitude	XLON	decimal degrees	93.1
Reservoir length	RLEN	decimal degrees	13000.0
Minimum layer thickness	SDZMIN	m	0.5
Maximum layer thickness	SDZMAX	m	2.0
Area coefficient	ACOEF(1)	m	561.81
Area coefficient	ACOEF(2)		2.79
Width coefficient	WCOEF(1)		47.7
Width coefficient	WCOEF(2)		0.55
Port 1 elevation	ELOUT(1)	m	56.4
Port 1 area	AROUT(1)	m^2	31.2
Port 2 elevation	ELOUT(2)	m	51.8
Port 2 area	AROUT(2)	m^2	31.2
Port 3 elevation	ELOUT(3)	m	44.4
Port 3 area	AROUT(3)	m^2	31.2
Physical coefficients			
Turbidity factor	TURB		2.0
Wind coefficient	AA	m/(sec - gm)	0
Wind coefficient	BB	1/mb	0.12×10^{-8}
Sheltering coefficient	SHELCF		1.0
Penetrative convection fraction	PEFRAC		0.01
Wind mixing coefficient	CDIFW		0.004
Advection mixing coefficient	CDIFF		0.0007
Critical density	CDENS		2.0

(Continued)

Parameter	Model Acronym	Units	Value
Physical coefficients (Cont.)			
Extinction coefficient			
For water	EXCO	1/m	0.45
For inorganic solids	EXTINS	1/m	0.01
For organic solids	EXTINP	1/m	0.1
Surface radiation fraction	SURFRAC		0.4
Reaeration coefficient - oxygen	DMO2	m^2/sec	2.04×10^{-9}
Reaeration coefficient - CO_2	DMCO2	m^2/sec	1.63×10^{-9}
Stoichiometry			
Carbon - organics			0.46
Nitrogen - organics			0.05
Phosphorus - organics			0.004
Oxygen - ammonia	O2NH3		4.57
Oxygen - nitrite + nitrate	O2NO2		1.14
Oxygen - detritus decay	O2DET		1.4
Oxygen - respiration	O2RESP		1.1
Oxygen - photosynthesis	O2FAC		1.4
Oxygen - dissolved organic decay	O2DOM		1.4
Oxygen - manganese	O2MN2		0.15
Oxygen - iron	O2FE2		0.14
Oxygen - sulfide	O2S2		2.0
Organic			
Phytoplankton			
Respiration rate	TPRESP	1/day	0.017
Gross production rate	TPMAX(1)	1/day	1.1
Fraction death to detritus	ALDIGO		0.25
Settling rate	TSETL(1)	m/day	0.14

(Continued)

Parameter	Model Acronym	Units	Value
Organic (Cont.)			
Half-saturation			
Carbon	PS2CO2(1)	mg/ℓ	0.12
Nitrogen	PS2N(1)	mg/ℓ	0.014
Phosphorus	PS2PO4(1)	mg/ℓ	0.009
Light saturation level	PISAT(1)	$kcal/m^2/hr$	50.0
Excretion rate	TPEXCR(1)	1/day	0.01
Mortality rate	TPMORT(1)	1/day	0.01
Temperature multipliers			
Low threshold	ALG1T1	°C	0
Low optimum	ALG1T2	°C	26.0
High optimum	ALG1T3	°C	30.0
High threshold	ALG1T4	°C	35.0
Low minimum	ALG1K1		0.1
High minimum	ALG1K4		0.1
Zooplankton			
Ingestion rate	TZMAX	1/day	0.44
Mortality rate	TZMORT	1/day	0.01
Efficiency	ZEFFIC		0.5
Food preference			
For algae 1	PREF(1)		0.5
For algae 2	PREF(2)		0
For detritus	PREF(3)		0.5
Respiration rate	TZRESP		0.14
Half-saturation	ZS2P	mg/ℓ	0.3
Temperature multiplier			
Low threshold	ZOOT1	°C	0
Low optimum	ZOOT2	°C	20.0

(Continued)

Parameter	Model Acronym	Units	Value
Organic (Cont.)			
High optimum	ZOOT3	°C	26.0
High threshold	ZOOT4	°C	36.0
Low minimum	ZOOK1		0.1
High minimum	ZOOK4		0.1
Fish			
Ingestion rate	TFMAX	1/day	0.015
Half-saturation	FS2FSH		0.2
Food preference			
For benthos and sediment	FPSED		0.03
For algae 1	FPALG(1)		0.37
For algae 2	FPALG(2)		0
For zooplankton	FPZOO		0.34
For detritus	FPDET		0.26
Efficiency	FEFFIC		0.8
Mortality rate	TFMORT	1/day	0.01
Respiration rate	TFRESP	1/day	0.01
Temperature multiplier			
Low threshold	FSH1T1	°C	1.0
Low optimum	FSH1T2	°C	24.4
High optimum	FSH1T3	°C	28.4
High threshold	FSH1T4	°C	35.2
Low minimum	FSH1K1		0.1
High minimum	FSH1K4		0.1
Decomposition			
Labile organics	TDOMDK	1/day	0.032
Ammonia	TNH3DK	1/day	0.08

(Continued)

Parameter	Model Acronym	Units	Value
Organic (Cont.)			
Detritus	TDETDK	1/day	0.009
Coliforms	TCOLDK	1/day	1.4
Sediment	TSEDDK	1/day	0.008
Refractory organics	TRFRDK	1/day	0.005
Labile to refractory	TDOMRF	1/day	0.005
Temperature multipliers			
DOM low threshold	DOMT1	°C	2.0
DOM optimum	DOMT2	°C	20.0
DOM low minimum	DOMK1		0.12
NH3 low threshold	NH3T1	°C	2.0
NH3 optimum	NH3T2	°C	32.0
NH3 low minimum	NH3K1		0.1
NO2 low threshold	NO2T1	°C	2.0
NO2 optimum	NO2T2	°C	32.0
NO2 low minimum	NO2K1		0.1
Inorganics			
Solids settling	TSSETL	m/day	0.05
PO4 adsorption	ADSRBP	$1/m^3$	150.0
Nitrogen adsorption	ADSRBN	$1/m^3$	125.0
PO4 adsorption	ADMAXP	g/g	0.007
Nitrogen maximum adsorption	ADMAXN	g/g	0.005

APPENDIX B: INITIAL VALUES OF STATE VARIABLES FOR THE 1979 AND 1980 DEGRAY SIMULATIONS

Variables	Units	1979 Lowest	1979 Highest	1980 Lowest	1980 Highest
Temperature	°C	5.2	5.5	6.4	9.0
Oxygen	mg/ℓ	9.2	9.5	0.8	9.9
Algae	mg/ℓ	0.0	1.6	0.0	1.0
Zooplankton	mg/ℓ	0.0	0.01	0.001	0.001
Coliforms	100/ℓ	20.0	1060.0	0.0	2.0
Ammonia - N	mg/ℓ	0.0	0.008	0.01	0.06
NO2-N + NO3-N	mg/ℓ	0.09	0.23	0.06	0.33
PO4-P	mg/ℓ	0.001	0.004	0.0	0.001
Detritus	mg/ℓ	0.0	0.0	0.2	0.7
Sediment	g/m^2	101.0	101.0	100.0	100.0
Alkalinity	mg/ℓ	14.8	20.0	15.0	115.0
Total dissolved solids	mg/ℓ	49.0	69.0	0.0	32.0
Suspended solids	mg/ℓ	6.0	6.0	6.0	28.0
Labile organics	mg/ℓ	1.9	4.4	1.7	3.1
Refractory organics	mg/ℓ	7.8	17.6	5.8	12.5
Inorganic carbon	mg/ℓ	4.0	8.7	7.0	53.0
Carbon dioxide	mg/ℓ	0.46	3.9	3.4	26.0
pH	mg/ℓ	6.6	7.4	5.9	6.5
Particulate manganese	mg/ℓ	0.1	0.1	0.0	0.0
Sediment manganese	mg/ℓ	30.0	30.0	30.0	30.0
Dissolved manganese	mg/ℓ	0.0	0.0	0.1	1.2
Particulate iron	mg/ℓ	0.0	0.1	0.0	0.0
Sediment iron	mg/ℓ	600.0	600.0	600.0	600.0
Dissolved iron	mg/ℓ	0.0	0.0	0.1	0.7
Iron sulfide - sediment	mg/ℓ	0.0	0.0	0.0	0.0
Iron sulfide - water	mg/ℓ	0.0	0.0	0.0	0.0
Sulfate	mg/ℓ	3.0	4.0	3.0	4.0
Sediment sulfur	mg/ℓ	10.0	10.0	10.0	10.0
Sulfide	mg/ℓ	0.0	0.0	0.0	0.1
Sediment P	mg/ℓ	20.0	20.0	20.0	20.0
Sediment N	mg/ℓ	50.0	50.0	50.0	50.0

APPENDIX C: 1979 DATA SET FOR DEGRAY LAKE

```
TITLE                         DEGRAY 1979
TITLE                     FINAL CALIBRATION
TITLE
TITLE
TITLE
JOB            1     362      24     720      25      79       1       0
OUTPUT COMPLETE
PHYS1          3       2      60    34.2    93.1       2       0 1.2-09
PHYS2      13000      .5     2.0
PHYS2+      1.25    1.25      1.      1.      1.      1.      1.      1. 1.
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1. 1.
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1. 1.
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1. 1.
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1. 1.
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1. 1.
PHYS2+        1.      1.      1.      1.      1.      1.
STRUCT        PORT
CHOICE SPECIFIED
PHYS3       56.4    5.58    5.58
PHYS3       51.8    5.58    5.58
PHYS3       44.4    5.58    5.58
PHYS4     561.81    2.79
PHYS5      47.70    0.55
MIXING       1.0     .01  .00004 .000008     2.0
LIGHT        .45     0.4     .01
DIFC2    2.04-09 1.63-09
ALG1         .10   0.017     .25
ALG2        1.10    0.14    .009    .014    0.12     50.    .010    .010
ALG3         0.8    0.14    .009     .01     0.1     20.    .020    .020
ALG3A        1.0    0.14    .009     .01     0.1     54.    .001    .001
ALG3++       .05
ALG4           0      26      30      35     0.1     0.1
ALG5           4      26      36      40     0.1     0.1
ALG5+          2      26      32      37     0.1     0.1
PLANT1       1.2      .2      .1     .05      .4      .3      .3
PLANT2       .02     .05     .01    .005     10.     30.      .5
PLANT3        2.     25.     29.     38.      .1      .1
ZOO1         .44    .010    0.50     0.5     0.0     0.0     0.5    0.14
ZOO2         .30     0.0      20      26      36     0.1     0.1
DET1         .35     4.0      28    0.01
FISH1      .0150      .2     .03     .37      0.     0.0     .34     .26
FISH2         1.    24.4    28.4    35.2      .1      .1      .8     .01     .01
DECAY1     0.032    0.08   0.009     1.4   .0080   .0050    .005      .2
DECAY2         2      20     .12
DECAY3         2      32     0.1
DECAY4         2      32     0.1
SSETL        .05    150.    125.    .007    .005
TMP         1.04
CHEM        4.57    1.14     1.4     1.1     1.4     1.4    0.15    0.14     2.0
ANAER1       0.5     5.0
ANAER2      0.05    0.02       0       5      35      40     0.1     0.1
ANAER3      0.10       0       5      35      40     0.1     0.1
ANAER4      0.00       0       5      35      40     0.1     0.1
ANAER5      0.05    0.03       0       5      35      40     0.1     0.1
ANAER6      0.10       0       5      35      40     0.1     0.1
ANAER7      0.00     0.0       0       5      35      40     0.1     0.1
ANAER8      0.90       0       5      35      40     0.1     0.1
ANAER9      0.50     0.5       0       5      35      40     0.1     0.1
ANAER10    0.001       0       5      35      40     0.1     0.1
ANAER11 0.000012       0       5      35      40     0.1     0.1
```

ANAER12	0.30	0.0	0	5	35	40	0.1	0.1	
ANAER13	0.001	0	5	35	40	0.1	0.1		
ANAER14	0.01	0	5	35	40	0.1	0.1		
INIT0	48								
INIT1	55.								
INIT2	0.	.001	0.	20.	1.001	.0001	.21	0.0	20.
INIT3	.0002	12.	9.4	.001	101.1	5.2	49.	.001	6.6
INIT4	6.0	0.1	0.0	0.1	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	14.5	.001	0.	20.	1.001	.0001	.21	0.0	20.
INIT3	.0002	12.	9.4	.001	101.1	5.2	49.	.001	6.6
INIT4	6.0	0.1	0.0	0.1	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	15.5	.001	0.	20.	1.001	.0001	.21	0.0	20.
INIT3	.0002	12.	9.3	.001	101.1	5.2	49.	.001	6.6
INIT4	6.0	0.1	0.0	0.1	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	16.5	.001	0.	20.	1.001	.0001	.21	0.0	20.
INIT3	.0002	12.	9.3	.001	101.1	5.2	49.	.001	6.6
INIT4	6.0	0.1	0.0	0.1	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	17.5	.001	0.	19.3	1.001	.0001	.21	0.0	46.7
INIT3	.0002	11.6	9.3	.001	101.1	5.2	51.7	.001	6.6
INIT4	6.0	0.1	0.0	0.1	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	18.5	.001	0.	18.7	1.001	.0001	.22	0.0	73.3
INIT3	.0002	11.3	9.3	.001	101.1	5.3	54.3	.001	6.6
INIT4	6.	0.1	0.0	0.1	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	19.5	.001	0.	18.	1.001	.0001	.22	0.0	100.
INIT3	.0002	10.9	9.3	.001	101.1	5.3	57.	.001	6.6
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	20.5	.001	0.	17.	1.001	.0001	.23	0.0	40.
INIT3	.0002	10.	9.3	.002	101.1	5.3	61.	.001	6.6
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	21.5	.001	0.	17.	1.001	.0001	.21	0.0	162.
INIT3	.0002	10.2	9.3	.002	101.1	5.3	60.6	.003	6.6
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	22.5	.001	0.	17.	1.001	.0001	.23	0.0	284.
INIT3	.0002	10.4	9.3	.002	101.1	5.3	60.2	.003	6.6
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	23.5	.001	0.	17.	1.001	.0001	.22	0.0	406.
INIT3	.0002	10.5	9.2	.001	101.1	5.3	59.8	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	24.5	.001	0.	17.	1.001	.0001	.22	0.0	528.
INIT3	.0002	10.7	9.3	.001	101.1	5.3	59.4	.003	6.7
INIT4	6.0	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	25.5	.001	0.	17.	1.001	.0001	.21	0.0	650.
INIT3	.0002	10.9	9.3	.001	101.1	5.3	59.	.003	6.7
INIT4	6.0	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	26.5	.001	0.	17.	1.001	.0001	.21	0.0	532.
INIT3	.0002	10.9	9.3	.001	101.1	5.3	59.	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.

INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	27.5	.001	0.	17.	1.001	.0001	.20	0.0	414.
INIT3	.0002	10.9	9.3	.001	101.1	5.2	59.	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	28.5	.001	0.	18.	1.001	.0001	.20	0.0	296.
INIT3	.0002	10.7	9.3	.001	101.1	5.3	58.	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	29.5	.001	0.	18.	1.001	.0001	.19	0.0	178.
INIT3	.0002	10.7	9.3	.001	101.1	5.3	58.	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	30.5	.001	0.	18.	1.001	.0001	.19	0.0	60.
INIT3	.0002	10.7	9.3	.001	101.1	5.3	58.	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	31.5	.001	0.	18.	1.001	.0001	.19	0.0	56.
INIT3	.0002	10.7	9.3	.001	101.1	5.3	58.6	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	32.5	.001	0.	18.	1.001	.0001	.20	0.0	52.
INIT3	.0002	10.7	9.3	.001	101.1	5.3	59.2	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	33.5	.001	0.	18.	1.001	.0001	.20	0.0	48.
INIT3	.0002	10.7	9.3	.001	101.1	5.3	59.8	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	34.5	.001	0.	18.	1.001	.0001	.21	0.0	44.
INIT3	.0002	10.7	9.3	.001	101.1	5.3	60.4	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	35.5	.001	0.	18.	1.001	.0001	.21	0.0	40.
INIT3	.0002	10.7	9.3	.001	101.1	5.3	61.	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	36.5	.001	0.	17.6	1.001	.0001	.21	0.0	74.
INIT3	.0002	11.7	9.3	.001	101.1	5.3	61.2	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	37.5	.001	0.	17.2	1.001	.0001	.21	0.0	108.
INIT3	.0002	12.8	9.3	.001	101.1	5.3	61.4	.003	6.7
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	38.5	.001	0.	16.8	1.001	.0001	.22	0.0	142.
INIT3	.0002	13.9	9.3	.001	101.1	5.3	61.6	.003	6.8
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	39.5	.001	0.	16.4	1.001	.0001	.22	0.0	176.
INIT3	.0002	14.9	9.3	.001	101.1	5.3	61.8	.003	6.8
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	40.5	.001	0.	16.	1.001	.0001	.22	0.0	210.
INIT3	.0002	16.	9.3	.001	101.1	5.3	62.	.003	6.8
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	41.5	.001	0.	16.4	1.001	.0001	.22	0.0	168.
INIT3	.0002	17.2	9.3	.001	101.1	5.3	61.2	.008	6.8
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.

INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	42.5	.001	0.	16.8	1.001	.0001	.22	0.0	126.
INIT3	.0002	18.4	9.3	.001	101.1	5.3	60.4	.008	6.8
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	43.5	.001	0.	17.2	1.001	.0001	.21	0.0	84.
INIT3	.0002	19.6	9.3	.001	101.1	5.2	59.6	.008	6.8
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	44.5	.001	0.	17.6	1.001	.0001	.21	0.0	42.
INIT3	.0002	20.8	9.3	.001	101.1	5.3	58.8	.008	6.8
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	45.5	.001	0.	18.	1.001	.0001	.21	0.0	0.
INIT3	.0002	22.	9.4	.001	101.1	5.3	58.	.008	6.8
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	46.5	.001	0.	17.7	1.001	.0001	.21	0.0	153.3
INIT3	.0002	20.4	9.3	.001	101.1	5.3	60.7	.007	6.8
INIT4	6.	0.1	0.0	0.0	0.0	0.0	4.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	47.5	.001	0.	17.3	1.001	.0001	.22	0.0	306.7
INIT3	.0002	18.7	9.4	.001	101.1	5.3	63.3	.007	6.9
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	48.5	.001	0.	17.	1.001	.0001	.22	0.0	460.
INIT3	.0002	17.1	9.4	.001	101.1	5.3	66.	.007	6.9
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	49.5	.001	0.	16.5	1.001	.0001	.22	0.0	231.
INIT3	.0002	13.6	9.3	.001	101.1	5.3	66.5	.007	6.9
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	50.5	1.5	0.	16.	1.001	.0001	.22	0.0	2.
INIT3	.0002	10.	9.3	.001	101.1	5.3	67.	.007	6.9
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	51.5	1.2	0.	17.	1.001	.0001	.16	0.0	16.
INIT3	.0002	9.8	9.4	.001	101.1	5.3	66.	.006	6.95
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	52.5	.4	0.	18.	1.001	.0001	.09	0.0	30.
INIT3	.0002	9.7	9.4	.001	101.1	5.3	65.	.006	7.0
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	53.5	.6	0.	16.5	1.001	.0001	.15	0.0	545.
INIT3	.0002	9.9	9.4	.001	101.1	5.3	65.5	.006	7.0
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	54.5	1.6	0.	15.0	1.001	.0001	.21	0.0	1060.
INIT3	.0002	10.2	9.4	.001	101.1	5.3	66.0	.006	7.0
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200.	400.	1000.	.001	1.		
INIT2	55.5	.94	0.	15.5	1.001	.0001	.22	0.0	570.
INIT3	.0002	10.	9.4	.001	101.1	5.3	64.	.006	7.05
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.
INIT5	12000.	0.0	200	400.	1000.	.001	1.		
INIT2	56.5	1.4	0.	16.	1.001	.0001	.22	0.0	80.
INIT3	.0002	10.0	9.4	.004	101.1	5.3	62.	.007	7.1
INIT4	6.	0.1	0.0	0.0	0.0	0.0	3.0	0.0	600.

```
INIT5      12000.     0.0    200.     400.    1000.      .001      1.
INIT2       57.5     1.42      0.      17.    1.001     .0001     .22      0.0       55.
INIT3      .0002      9.9     9.4     .001    101.1       5.4    65.5     .007       7.2
INIT4         6.      0.1     0.0      0.0      0.0       0.0     3.0      0.0      600.
INIT5      12000.     0.0    200.     400.    1000.      .001      1.
INIT2       58.5       .8      0.     16.5    1.001      .005     .22      0.0       3.8
INIT3      .0002      11.     9.4     .002    101.1       5.4     69.     .007       7.2
INIT4         6.      0.1     0.0      0.0      0.0       0.0     3.0      0.0      600.
INIT5      12000.     0.0    200.     400.    1000.      .001      1.
INIT2       59.5      1.5      0.     15.7    1.001      .007     .21      0.0       4.9
INIT3      .0002     13.7     9.5     .002    101.1       5.4     63.     .007       7.3
INIT4         6.      0.1     0.0      0.0      0.0       0.0     3.0      0.0      600.
INIT5      12000.     0.0    200.     400.    1000.      .001      1.
INIT2       59.7      1.4      0.     14.8    1.001      .008     .21      0.0        6.
INIT3      .0002     16.3     9.5     .002    101.1       5.5     57.     .007       7.4
INIT4         6.      0.1     0.0      0.0      0.0       0.0     3.0      0.0      600.
INIT5      12000.     0.0    200.     400.    1000.      .001      1.
INIT PL        0.      0.      0.       0.       0.        0.      0.
FILES    PLTWC    PLDG15  PLDG16  PLDG17  FLUX
ID          DEGRAY79 NOV 2 83 N1  CDC+JW
WEATH1           24       365
W2 LTLRC 79 1 1           0.9    -2.0     -7.4   1013.5      19.7
W2 LTLRC 79 1 2           0.0    -7.2    -17.2   1022.9      16.2
W2 LTLRC 79 1 3           0.3    -3.3    -11.9   1027.1       5.8
W2 LTLRC 79 1 4           0.6    -0.3     -7.8   1028.3       6.3
W2 LTLRC 79 1 5           1.0     0.3     -3.5   1023.1      10.4
W2 LTLRC 79 1 6           1.0    -2.6     -6.5   1015.1      13.7
W2 LTLRC 79 1 7           0.9    -1.5     -6.3   1011.5      13.0
W2 LTLRC 79 1 8           0.1    -6.3    -13.2   1022.1       8.1
W2 LTLRC 79 1 9           0.2    -4.7     -8.8   1022.4       4.9
W2 LTLRC 79 110           0.9    -3.9     -6.7   1022.2       7.6
W2 LTLRC 79 111           0.9    -5.1    -11.0   1017.9      14.1
W2 LTLRC 79 112           0.9    -2.4     -6.8   1006.6      10.9
W2 LTLRC 79 113           0.9    -1.2     -4.3    998.8      11.3
W2 LTLRC 79 114           0.0    -7.1    -15.3   1018.2      17.8
W2 LTLRC 79 115           0.6    -4.7    -12.4   1020.5       9.0
W2 LTLRC 79 116           1.0     1.7     -3.6   1017.7       3.2
W2 LTLRC 79 117           1.0     7.0      4.1   1017.0       2.5
W2 LTLRC 79 118           0.9     4.0     -1.3   1017.2      12.0
W2 LTLRC 79 119           1.0     6.1      4.2   1004.8       5.3
W2 LTLRC 79 120           1.0     7.6      6.9    993.1      16.7
W2 LTLRC 79 121           0.7     1.0     -5.5   1000.1      19.9
W2 LTLRC 79 122           0.5     0.2     -3.3   1006.1       7.6
W2 LTLRC 79 123           1.0     2.2     -0.2    993.9      17.8
W2 LTLRC 79 124           0.0    -2.8    -11.5   1003.7      21.1
W2 LTLRC 79 125           0.7    -1.9     -7.0   1009.1       7.9
W2 LTLRC 79 126           1.0     0.      -2.4   1004.7      10.9
W2 LTLRC 79 127           0.9    -0.7     -3.8   1001.3      16.4
W2 LTLRC 79 128           0.2    -3.1     -9.6   1010.3      14.1
W2 LTLRC 79 129           0.6    -3.7     -9.7   1013.4       7.9
W2 LTLRC 79 130           1.0     0.1     -4.6   1010.5       7.9
W2 LTLRC 79 131           0.2    -3.6    -11.5   1015.5      19.2
W2 LTLRC 79 2 1           0.5    -5.3    -11.6   1018.1       6.3
W2 LTLRC 79 2 2           1.0     0.1     -4.4   1013.5       3.9
W2 LTLRC 79 2 3           1.0     3.2      0.1   1012.1       4.6
W2 LTLRC 79 2 4           0.8     0.3     -5.2   1017.0      12.0
W2 LTLRC 79 2 5           1.0    -2.2    -10.5   1016.6      14.6
W2 LTLRC 79 2 6           1.0    -0.8     -5.3   1004.8      11.6
W2 LTLRC 79 2 7           1.0     1.1     -2.6   1006.7       8.6
W2 LTLRC 79 2 8           0.9     0.4     -3.5   1012.2      14.6
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W2	LTLRC	79	2 9	0.2	-8.6	-16.3	1022.8	11.1
W2	LTLRC	79	210	0.2	-4.2	-9.9	1018.9	2.1
W2	LTLRC	79	211	0.5	1.8	-2.9	1016.2	4.2
W2	LTLRC	79	212	1.0	8.8	3.9	1016.3	7.4
W2	LTLRC	79	213	1.0	1.6	-3.3	1015.4	7.9
W2	LTLRC	79	214	0.7	6.5	4.0	1006.7	1.9
W2	LTLRC	79	215	0.9	17.6	11.5	1007.5	18.5
W2	LTLRC	79	216	0.7	1.0	-6.5	1019.8	20.8
W2	LTLRC	79	217	1.0	-3.0	-8.5	1020.4	19.2
W2	LTLRC	79	218	0.7	-0.5	-5.4	1020.2	10.6
W2	LTLRC	79	219	0.2	1.3	-3.5	1022.3	2.3
W2	LTLRC	79	220	0.8	3.9	0.3	1013.7	4.9
W2	LTLRC	79	221	1.0	10.6	6.4	1013.8	3.9
W2	LTLRC	79	222	1.0	15.7	13.8	1010.9	9.7
W2	LTLRC	79	223	1.0	17.7	15.6	1010.3	4.4
W2	LTLRC	79	224	1.0	7.8	5.7	1007.4	14.8
W2	LTLRC	79	225	0.6	4.0	-0.9	1009.0	24.3
W2	LTLRC	79	226	0.1	4.9	-5.0	1016.0	7.6
W2	LTLRC	79	227	0.4	5.6	-0.8	1011.7	5.6
W2	LTLRC	79	228	0.9	10.3	6.6	1006.4	11.3
W2	LTLRC	79	3 1	0.9	9.0	5.2	1013.8	8.1
W2	LTLRC	79	3 2	0.7	8.[illegible]	5.9	1011.9	10.2
W2	LTLRC	79	3 3	0.7	17.4	11.5	1000.7	13.9
W2	LTLRC	79	3 4	0.6	4.7	-2.8	1009.0	17.6
W2	LTLRC	79	3 5	0.1	6.3	-5.2	1016.1	11.6
W2	LTLRC	79	3 6	0.2	11.0	-1.3	1013.3	5.8
W2	LTLRC	79	3 7	0.5	12.6	0.9	1007.2	15.3
W2	LTLRC	79	3 8	0.2	7.0	-1.9	1009.0	8.8
W2	LTLRC	79	3 9	0.8	12.2	4.6	1010.5	12.5
W2	LTLRC	79	310	0.7	7.9	-0.3	1016.6	11.3
W2	LTLRC	79	311	0.	8.5	-5.5	1018.3	6.0
W2	LTLRC	79	312	0.2	14.5	0.3	1016.7	5.8
W2	LTLRC	79	313	0.6	18.7	4.8	1012.1	16.0
W2	LTLRC	79	314	0.1	13.2	-4.4	1021.3	14.6
W2	LTLRC	79	315	0.6	7.3	-2.0	1025.0	11.1
W2	LTLRC	79	316	1.0	8.8	-1.3	1024.2	9.5
W2	LTLRC	79	317	0.5	15.4	6.5	1021.2	8.8
W2	LTLRC	79	318	0.8	18.4	14.0	1015.5	13.7
W2	LTLRC	79	319	1.0	20.8	17.1	1014.4	11.8
W2	LTLRC	79	320	0.8	19.5	15.9	1013.3	12.7
W2	LTLRC	79	321	1.0	14.7	13.0	1013.4	11.8
W2	LTLRC	79	322	0.9	16.7	15.6	1004.2	10.9
W2	LTLRC	79	323	0.6	11.6	7.8	993.7	19.4
W2	LTLRC	79	324	0.3	8.0	-2.1	1000.1	23.8
W2	LTLRC	79	325	0.	8.4	-5.0	1005.9	14.6
W2	LTLRC	79	326	0.4	10.6	1.9	1011.7	11.8
W2	LTLRC	79	327	1.0	10.1	8.7	1015.8	13.2
W2	LTLRC	79	328	1.0	17.2	13.3	1016.1	11.6
W2	LTLRC	79	329	1.0	20.9	14.3	1014.3	17.6
W2	LTLRC	79	330	1.0	19.4	16.0	1013.1	16.4
W2	LTLRC	79	331	1.0	19.4	16.5	1014.0	5.6
W2	LTLRC	79	4 1	1.0	16.3	15.8	1006.4	6.5
W2	LTLRC	79	4 2	0.7	13.8	9.9	1010.6	13.7
W2	LTLRC	79	4 3	0.7	10.8	6.7	1012.5	15.5
W2	LTLRC	79	4 4	0.8	10.3	6.9	1010.6	12.7
W2	LTLRC	79	4 5	0.1	11.9	4.4	1016.1	9.3
W2	LTLRC	79	4 6	0.0	11.9	5.9	1020.6	13.2
W2	LTLRC	79	4 7	0.3	15.8	8.5	1017.4	10.6
W2	LTLRC	79	4 8	0.9	16.8	14.7	1007.2	14.1
W2	LTLRC	79	4 9	0.1	12.1	6.6	1007.5	12.0

W2	LTLRC	79	410	1.0	11.5	8.7	1005.5	17.4
W2	LTLRC	79	411	0.9	20.5	17.8	999.2	14.1
W2	LTLRC	79	412	0.7	20.8	14.9	1004.9	5.3
W2	LTLRC	79	413	0.3	17.3	8.1	1009.1	9.5
W2	LTLRC	79	414	0.0	17.6	10.3	1013.2	6.5
W2	LTLRC	79	415	0.	18.5	10.6	1016.4	5.8
W2	LTLRC	79	416	0.	20.1	10.4	1017.6	6.0
W2	LTLRC	79	417	0.7	21.3	11.7	1018.7	5.6
W2	LTLRC	79	418	0.9	19.9	12.5	1018.9	3.5
W2	LTLRC	79	419	0.7	22.8	13.0	1017.8	10.2
W2	LTLRC	79	420	0.8	20.5	12.2	1016.1	8.3
W2	LTLRC	79	421	1.0	20.0	12.8	1017.8	10.0
W2	LTLRC	79	422	1.0	17.6	14.4	1016.4	21.8
W2	LTLRC	79	423	0.8	19.6	17.4	1009.8	19.4
W2	LTLRC	79	424	0.5	19.3	15.6	1009.1	8.1
W2	LTLRC	79	425	0.6	21.0	16.7	1006.9	8.8
W2	LTLRC	79	426	0.4	19.1	10.0	1006.3	18.1
W2	LTLRC	79	427	0.6	15.5	6.4	1011.0	12.5
W2	LTLRC	79	428	0.4	14.0	2.8	1014.8	6.0
W2	LTLRC	79	429	0.7	16.8	7.9	1014.5	7.2
W2	LTLRC	79	430	0.4	16.7	8.7	1016.0	9.7
W2	LTLRC	79	5 1	0.7	18.0	10.8	1013.9	5.8
W2	LTLRC	79	5 2	1.0	21.0	16.0	1010.3	11.6
W2	LTLRC	79	5 3	1.0	21.2	17.2	1009.7	14.1
W2	LTLRC	79	5 4	1.0	16.3	13.7	1010.5	15.0
W2	LTLRC	79	5 5	0.3	15.6	8.6	1013.0	10.4
W2	LTLRC	79	5 6	0.5	17.4	12.7	1009.0	14.1
W2	LTLRC	79	5 7	0.1	22.4	15.7	1007.4	12.7
W2	LTLRC	79	5 8	0.2	26.0	19.1	1009.1	14.6
W2	LTLRC	79	5 9	0.4	25.7	19.4	1009.3	12.5
W2	LTLRC	79	510	0.5	24.7	20.5	1009.9	9.7
W2	LTLRC	79	511	1.0	20.6	17.8	991.0	11.3
W2	LTLRC	79	512	0.8	15.8	8.2	1015.1	16.0
W2	LTLRC	79	513	0.1	18.0	8.3	1016.9	7.4
W2	LTLRC	79	514	0.0	21.5	12.7	1017.8	10.9
W2	LTLRC	79	515	0.1	22.2	15.8	1020.5	10.2
W2	LTLRC	79	516	0.4	21.2	12.3	1022.4	10.4
W2	LTLRC	79	517	0.1	21.7	12.8	1020.8	5.6
W2	LTLRC	79	518	0.6	22.5	13.8	1016.4	7.9
W2	LTLRC	79	519	0.4	25.1	17.3	1013.3	12.5
W2	LTLRC	79	520	0.8	25.6	18.3	1012.0	12.0
W2	LTLRC	79	521	1.0	20.8	17.2	1012.1	18.5
W2	LTLRC	79	522	1.0	19.7	16.5	1011.2	14.1
W2	LTLRC	79	523	0.6	22.4	14.9	1011.9	13.7
W2	LTLRC	79	524	0.2	18.9	8.3	1015.1	17.4
W2	LTLRC	79	525	0.1	18.5	6.5	1016.6	12.5
W2	LTLRC	79	526	0.7	16.9	9.9	1012.7	11.6
W2	LTLRC	79	527	0.9	19.8	15.7	1009.7	11.1
W2	LTLRC	79	528	0.9	20.5	17.3	1010.8	4.6
W2	LTLRC	79	529	1.0	21.3	17.6	1008.6	7.6
W2	LTLRC	79	530	0.9	23.5	19.2	1007.4	9.3
W2	LTLRC	79	531	0.7	25.1	19.9	1013.2	10.0
W2	LTLRC	79	6 1	0.7	24.8	19.3	1019.2	10.4
W2	LTLRC	79	6 2	1.0	21.3	18.1	1015.9	13.2
W2	LTLRC	79	6 3	1.0	20.[illegible]	16.1	1014.4	9.5
W2	LTLRC	79	6 4	0.5	23.8	17.5	1012.5	5.6
W2	LTLRC	79	6 5	0.7	24.0	18.8	1009.9	5.8
W2	LTLRC	79	6 6	1.0	24.9	20.6	1008.6	7.6
W2	LTLRC	79	6 7	0.7	27.0	22.5	1009.4	15.3
W2	LTLRC	79	6 8	0.4	28.6	22.1	1015.2	11.6

W2	LTLRC	79	6 9	0.2	28.7	21.7	1017.0	9.7
W2	LTLRC	79	610	0.4	24.6	16.4	1018.2	15.5
W2	LTLRC	79	611	0.0	22.4	10.6	1021.5	11.6
W2	LTLRC	79	612	0.1	23.8	12.6	1020.4	7.9
W2	LTLRC	79	613	0.6	24.7	14.2	1019.7	10.2
W2	LTLRC	79	614	0.2	25.7	15.8	1019.6	7.4
W2	LTLRC	79	615	0.0	25.3	14.9	1019.1	12.7
W2	LTLRC	79	616	0.1	25.6	16.8	1015.8	8.8
W2	LTLRC	79	617	0.2	26.9	17.7	1015.1	11.6
W2	LTLRC	79	618	0.3	27.1	18.1	1017.1	15.5
W2	LTLRC	79	619	0.3	28.7	21.2	1017.6	18.1
W2	LTLRC	79	620	0.5	29.8	22.2	1018.8	18.5
W2	LTLRC	79	621	0.9	24.8	21.2	1019.0	11.6
W2	LTLRC	79	622	0.6	25.8	21.3	1017.7	6.7
W2	LTLRC	79	623	0.8	26.8	22.2	1016.8	8.3
W2	LTLRC	79	624	0.9	23.8	20.1	1018.5	11.6
W2	LTLRC	79	625	0.6	22.0	15.2	1021.5	13.2
W2	LTLRC	79	626	0.2	23.4	15.1	1022.6	8.1
W2	LTLRC	79	627	0.2	24.4	16.9	1021.8	3.0
W2	LTLRC	79	628	0.6	25.6	18.5	1018.8	11.1
W2	LTLRC	79	629	0.5	28.9	20.6	1015.0	9.7
W2	LTLRC	79	630	0.6	26.4	17.4	1014.7	10.4
W2	LTLRC	79	7 1	0.9	25.0	19.9	1013.4	7.6
W2	LTLRC	79	7 2	0.6	28.6	21.6	1015.9	10.2
W2	LTLRC	79	7 3	0.1	29.0	21.7	1017.1	12.7
W2	LTLRC	79	7 4	0.5	30.0	22.4	1015.4	13.0
W2	LTLRC	79	7 5	0.6	28.9	23.4	1017.6	10.0
W2	LTLRC	79	7 6	1.0	24.1	19.5	1019.8	12.0
W2	LTLRC	79	7 7	0.9	24.9	20.6	1020.0	8.6
W2	LTLRC	79	7 8	0.8	26.9	22.8	1018.0	7.2
W2	LTLRC	79	7 9	0.8	24.0	21.3	1013.9	9.7
W2	LTLRC	79	710	0.9	24.0	20.4	1011.7	6.0
W2	LTLRC	79	711	0.9	25.2	21.4	1010.4	8.8
W2	LTLRC	79	712	0.5	26.1	21.1	1012.7	9.7
W2	LTLRC	79	713	0.4	27.0	22.2	1014.6	10.2
W2	LTLRC	79	714	0.6	26.8	23.1	1015.7	11.3
W2	LTLRC	79	715	0.4	27.0	23.4	1018.2	11.1
W2	LTLRC	79	716	0.5	28.0	23.1	1020.6	10.9
W2	LTLRC	79	717	0.9	27.5	22.8	1019.8	12.5
W2	LTLRC	79	718	0.7	25.1	18.1	1018.7	14.8
W2	LTLRC	79	719	0.6	26.2	18.4	1017.5	13.9
W2	LTLRC	79	720	0.5	26.2	17.6	1018.1	11.8
W2	LTLRC	79	721	0.4	25.5	18.2	1017.1	5.8
W2	LTLRC	79	722	0.5	25.9	19.2	1015.9	5.6
W2	LTLRC	79	723	0.6	27.0	22.1	1014.4	12.3
W2	LTLRC	79	724	0.7	26.3	23.3	1013.2	9.5
W2	LTLRC	79	725	0.8	26.7	23.5	1012.7	9.0
W2	LTLRC	79	726	1.0	25.0	23.1	1012.7	12.0
W2	LTLRC	79	727	1.0	25.1	23.3	1012.2	15.7
W2	LTLRC	79	728	0.8	27.3	23.5	1014.7	11.8
W2	LTLRC	79	729	0.4	28.8	23.9	1017.1	11.8
W2	LTLRC	79	730	0.2	28.2	22.8	1015.5	12.0
W2	LTLRC	79	731	0.5	27.6	23.0	1015.8	11.8
W2	LTLRC	79	8 1	0.6	26.9	21.4	1015.0	12.3
W2	LTLRC	79	8 2	0.7	24.9	21.9	1014.3	6.5
W2	LTLRC	79	8 3	0.9	25.2	22.0	1016.0	7.6
W2	LTLRC	79	8 4	0.4	26.7	22.6	1018.6	5.1
W2	LTLRC	79	8 5	0.2	28.2	22.1	1020.8	8.3
W2	LTLRC	79	8 6	0.1	27.9	23.0	1020.4	4.9
W2	LTLRC	79	8 7	0.1	28.0	23.3	1019.7	5.8

W2	LTLRC	79 8 8	0.2	28.1	23.4	1020.5	4.2
W2	LTLRC	79 8 9	0.4	27.1	23.2	1019.9	7.2
W2	LTLRC	79 810	0.5	26.9	23.3	1017.3	10.2
W2	LTLRC	79 811	0.7	24.2	20.0	1012.9	13.4
W2	LTLRC	79 812	0.3	21.4	17.2	1015.3	10.4
W2	LTLRC	79 813	0.3	22.2	18.1	1017.9	5.8
W2	LTLRC	79 814	0.4	25.1	20.6	1020.3	6.9
W2	LTLRC	79 815	0.5	25.2	21.7	1020.6	8.6
W2	LTLRC	79 816	0.8	21.6	16.8	1021.3	9.7
W2	LTLRC	79 817	0.	24.0	18.3	1019.8	6.3
W2	LTLRC	79 818	0.2	26.5	20.7	1018.0	7.9
W2	LTLRC	79 819	0.4	27.6	22.6	1016.8	10.4
W2	LTLRC	79 820	0.4	26.2	21.9	1015.5	11.6
W2	LTLRC	79 821	0.4	24.2	22.1	1014.1	6.3
W2	LTLRC	79 822	0.8	22.9	21.0	1011.5	6.5
W2	LTLRC	79 823	0.6	24.9	21.1	1010.8	6.0
W2	LTLRC	79 824	1.0	24.9	21.4	1011.5	10.0
W2	LTLRC	79 825	0.8	23.8	21.3	1013.6	7.2
W2	LTLRC	79 826	0.6	25.8	21.9	1015.6	6.9
W2	LTLRC	79 827	0.6	24.5	22.2	1014.7	7.2
W2	LTLRC	79 828	0.7	24.8	22.4	1012.0	10.0
W2	LTLRC	79 829	0.2	27.8	23.3	1013.5	7.2
W2	LTLRC	79 830	0.2	27.4	23.3	1016.8	6.9
W2	LTLRC	79 831	0.4	26.7	23.1	1014.9	10.6
W2	LTLRC	79 9 1	0.8	24.7	22.0	1012.0	10.0
W2	LTLRC	79 9 2	0.8	26.1	22.4	1012.4	8.3
W2	LTLRC	79 9 3	0.5	26.6	22.8	1013.6	5.1
W2	LTLRC	79 9 4	0.3	27.4	23.4	1013.1	6.3
W2	LTLRC	79 9 5	0.4	27.2	23.1	1012.7	5.6
W2	LTLRC	79 9 6	0.5	26.5	22.1	1013.6	7.2
W2	LTLRC	79 9 7	0.1	25.6	20.3	1015.6	14.1
W2	LTLRC	79 9 8	0.	21.7	14.0	1017.4	13.7
W2	LTLRC	79 9 9	0.	20.3	14.4	1017.4	13.0
W2	LTLRC	79 910	0.2	22.4	17.8	1015.9	6.0
W2	LTLRC	79 911	0.3	23.0	18.5	1015.5	7.4
W2	LTLRC	79 912	0.7	23.6	19.1	1012.0	8.8
W2	LTLRC	79 913	0.6	24.2	17.4	1008.3	20.6
W2	LTLRC	79 914	C.	20.2	10.7	1016.7	17.6
W2	LTLRC	79 915	0.1	18.0	8.2	1020.2	14.4
W2	LTLRC	79 916	0.1	18.2	9.7	1019.5	15.3
W2	LTLRC	79 917	0.9	20.3	16.4	1017.7	11.6
W2	LTLRC	79 918	1.0	20.8	19.7	1017.2	9.5
W2	LTLRC	79 919	1.0	21.7	20.1	1016.1	5.6
W2	LTLRC	79 920	1.0	20.1	19.5	1008.0	16.2
W2	LTLRC	79 921	0.6	21.1	16.7	1007.1	18.3
W2	LTLRC	79 922	0.1	19.4	12.8	1015.4	9.3
W2	LTLRC	79 923	0.	17.9	12.6	1017.2	7.6
W2	LTLRC	79 924	0.	17.5	12.4	1017.9	6.0
W2	LTLRC	79 925	0.2	18.7	13.5	1019.4	4.9
W2	LTLRC	79 926	0.1	19.9	15.8	1018.6	5.6
W2	LTLRC	79 927	0.1	20.8	16.0	1014.3	5.6
W2	LTLRC	79 928	0.1	21.5	17.2	1012.9	8.3
W2	LTLRC	79 929	0.2	23.4	19.0	1014.2	3.9
W2	LTLRC	79 930	0.	24.4	17.8	1014.2	6.0
W2	LTLRC	7910 1	0.1	24.4	18.1	1011.2	10.9
W2	LTLRC	7910 2	0.4	19.6	8.0	1011.5	13.2
W2	LTLRC	7910 3	0.4	19.7	12.5	1010.8	11.3
W2	LTLRC	7910 4	0.2	17.4	4.6	1015.0	15.3
W2	LTLRC	7910 5	0.3	15.0	4.5	1010.2	12.5
W2	LTLRC	7910 6	0.4	18.2	7.0	1008.7	13.7

W2	LTLRC	7910 7	0.	19.7	10.9	1012.8	10.4
W2	LTLRC	7910 8	0.3	23.2	15.6	1009.9	15.3
W2	LTLRC	7910 9	0.9	16.7	11.8	1013.3	17.1
W2	LTLRC	791010	0.6	11.2	3.3	1014.1	10.4
W2	LTLRC	791011	0.1	17.2	7.9	1024.7	16.4
W2	LTLRC	791012	0.3	21.6	12.8	1006.2	13.4
W2	LTLRC	791013	0.3	15.0	2.0	1016.6	16.4
W2	LTLRC	791014	0.2	12.1	4.6	1019.6	6.7
W2	LTLRC	791015	0.9	16.0	5.8	1015.8	7.4
W2	LTLRC	791016	0.8	19.2	11.9	1014.2	9.3
W2	LTLRC	791017	0.7	20.8	15.7	1016.3	7.2
W2	LTLRC	791018	0.4	21.5	16.6	1017.0	7.6
W2	LTLRC	791019	0.4	21.5	16.3	1012.5	15.3
W2	LTLRC	791020	0.6	25.1	18.6	1011.0	18.3
W2	LTLRC	791021	0.6	26.6	20.1	1011.5	18.3
W2	LTLRC	791022	0.4	18.0	10.2	1010.5	18.5
W2	LTLRC	791023	0.	13.1	1.7	1015.7	10.4
W2	LTLRC	791024	0.1	13.1	5.3	1014.8	1.9
W2	LTLRC	791025	0.0	15.3	7.4	1014.7	3.2
W2	LTLRC	791026	0.0	16.5	8.8	1015.1	6.0
W2	LTLRC	791027	0.2	18.4	11.5	1012.6	13.0
W2	LTLRC	791028	0.9	17.9	14.3	1009.3	13.2
W2	LTLRC	791029	0.8	15.5	11.9	1008.9	6.3
W2	LTLRC	791030	0.8	19.2	14.9	1005.6	18.3
W2	LTLRC	791031	0.6	16.3	9.2	1005.0	19.2
W2	LTLRC	7911 1	0.	10.8	2.4	1014.0	10.2
W2	LTLRC	7911 2	0.4	11.9	1.5	1016.6	8.8
W2	LTLRC	7911 3	0.1	11.4	1.0	1019.4	10.0
W2	LTLRC	7911 4	0.3	9.9	1.5	1019.7	8.3
W2	LTLRC	7911 5	0.4	12.3	3.5	1018.4	12.7
W2	LTLRC	7911 6	0.3	11.8	5.7	1022.6	18.3
W2	LTLRC	7911 7	0.5	7.8	3.0	1019.4	9.5
W2	LTLRC	7911 8	1.0	11.9	7.9	1007.5	6.5
W2	LTLRC	7911 9	1.0	14.3	13.3	998.7	16.4
W2	LTLRC	791110	0.2	6.4	0.3	1011.9	15.3
W2	LTLRC	791111	0.1	4.8	-1.0	1016.4	15.5
W2	LTLRC	791112	0.2	6.3	0.4	1017.1	11.1
W2	LTLRC	791113	0.1	7.4	0.8	1019.6	11.8
W2	LTLRC	791114	0.0	6.0	0.6	1022.4	6.0
W2	LTLRC	791115	0.1	10.4	2.9	1020.4	12.0
W2	LTLRC	791116	0.1	12.6	3.7	1019.4	12.0
W2	LTLRC	791117	0.5	12.3	4.3	1017.3	11.6
W2	LTLRC	791118	0.6	14.3	9.3	1014.3	10.0
W2	LTLRC	791119	0.6	19.0	15.8	1016.9	12.7
W2	LTLRC	791120	0.7	17.8	13.1	1017.7	8.6
W2	LTLRC	791121	1.0	18.4	15.8	1012.9	8.6
W2	LTLRC	791122	0.9	9.6	4.3	1012.4	13.9
W2	LTLRC	791123	0.5	6.0	0.8	1010.4	8.3
W2	LTLRC	791124	0.6	5.8	0.3	1014.0	3.7
W2	LTLRC	791125	0.9	6.3	3.6	1003.8	5.6
W2	LTLRC	791126	0.1	9.0	3.6	1007.0	6.5
W2	LTLRC	791127	0.7	14.3	8.9	1010.4	14.8
W2	LTLRC	791128	0.	5.3	-3.5	1019.7	13.9
W2	LTLRC	791129	0.1	1.2	-9.4	1020.6	15.0
W2	LTLRC	791130	0.3	0.7	-7.8	1018.0	8.8
W2	LTLRC	7912 1	0.0	4.2	-7.1	1017.4	11.6
W2	LTLRC	7912 2	0.	0.3	-8.5	1028.0	15.0
W2	LTLRC	7912 3	0.2	1.5	-5.8	1024.8	8.8
W2	LTLRC	7912 4	0.1	6.5	-2.6	1020.6	7.2
W2	LTLRC	7912 5	0.2	11.0	2.4	1024.8	11.8

W2 LTLRC 7912 6	0.4	10.1	1.2	1004.0	9.3
W2 LTLRC 7912 7	0.	10.3	-2.2	1011.2	10.4
W2 LTLRC 7912 8	0.	6.7	-6.0	1026.0	13.2
W2 LTLRC 7912 9	0.2	5.6	-4.3	1023.6	5.6
W2 LTLRC 791210	0.1	9.7	0.3	1016.3	8.6
W2 LTLRC 791211	0.9	15.8	9.7	1013.0	9.0
W2 LTLRC 791212	1.0	7.2	4.9	1014.6	8.3
W2 LTLRC 791213	0.8	6.0	0.2	1019.2	10.9
W2 LTLRC 791214	0.1	4.6	-4.5	1023.9	14.4
W2 LTLRC 791215	0.1	4.8	-2.6	1016.8	3.7
W2 LTLRC 791216	0.	4.3	-3.1	1018.6	15.7
W2 LTLRC 791217	0.	-4.8	-15.4	1028.1	12.5
W2 LTLRC 791218	0.0	0.7	-11.4	1019.0	10.2
W2 LTLRC 791219	0.3	7.5	-4.6	1013.4	8.1
W2 LTLRC 791220	0.8	10.6	5.8	1013.8	3.9
W2 LTLRC 791221	1.0	15.3	12.6	1013.9	12.0
W2 LTLRC 791222	1.0	15.7	13.9	1007.9	13.2
W2 LTLRC 791223	1.0	16.7	15.1	1004.4	16.4
W2 LTLRC 791224	0.9	9.0	5.6	1006.2	22.2
W2 LTLRC 791225	0.0	7.8	-0.5	1015.5	12.3
W2 LTLRC 791226	0.3	7.4	2.6	1014.5	4.2
W2 LTLRC 791227	0.7	7.8	4.9	1018.4	10.0
W2 LTLRC 791228	0.9	5.1	1.6	1021.3	17.1
W2 LTLRC 791229	0.9	4.9	0.7	1015.8	7.9
W2 LTLRC 791230	0.7	4.7	0.5	1011.2	10.6
W2 LTLRC 791231	0.9	6.9	-0.1	1011.5	13.4
FHARV1 8760	2				
FHARV2 2.5					
FHARV2 2.5					
OUTL1 24	365				
OUTL3 DGRA 79001	1	10.0			
OUTL3 DGRA 79002	1	10.0			
OUTL3 DGRA 79003	1	41.1			
OUTL3 DGRA 79004	1	63.8			
OUTL3 DGRA 79005	1	51.5			
OUTL3 DGRA 79006	1	36.9			
OUTL3 DGRA 79007	1	36.9			
OUTL3 DGRA 79008	1	36.9			
OUTL3 DGRA 79009	1	20.1			
OUTL3 DGRA 79010	1	10.0			
OUTL3 DGRA 79011	1	10.0			
OUTL3 DGRA 79012	1	10.0			
OUTL3 DGRA 79013	1	10.0			
OUTL3 DGRA 79014	1	10.0			
OUTL3 DGRA 79015	1	10.0			
OUTL3 DGRA 79016	1	10.0			
OUTL3 DGRA 79017	1	10.0			
OUTL3 DGRA 79018	1	10.0			
OUTL3 DGRA 79019	1	10.0			
OUTL3 DGRA 79020	1	10.0			
OUTL3 DGRA 79021	1	10.0			
OUTL3 DGRA 79022	1	10.0			
OUTL3 DGRA 79023	1	10.0			
OUTL3 DGRA 79024	1	10.0			
OUTL3 DGRA 79025	1	21.5			
OUTL3 DGRA 79026	1	36.9			
OUTL3 DGRA 79027	1	36.9			
OUTL3 DGRA 79028	1	36.9			
OUTL3 DGRA 79029	1	26.8			
OUTL3 DGRA 79030	1	10.0			

OUTL3 DGRA 79031	1	10.0			
OUTL3 DGRA 79032	1	10.0			
OUTL3 DGRA 79033	1	10.0			
OUTL3 DGRA 79034	1	10.0			
OUTL3 DGRA 79035	1	10.0			
OUTL3 DGRA 79036	1	10.0			
OUTL3 DGRA 79037	1	10.0			
OUTL3 DGRA 79038	1	10.0			
OUTL3 DGRA 79039	1	10.0			
OUTL3 DGRA 79040	1	10.0			
OUTL3 DGRA 79041	1	10.0			
OUTL3 DGRA 79042	1	10.0			
OUTL3 DGRA 79043	1	10.0			
OUTL3 DGRA 79044	1	10.0			
OUTL3 DGRA 79045	1	10.0			
OUTL3 DGRA 79046	1	10.0			
OUTL3 DGRA 79047	1	10.0			
OUTL3 DGRA 79048	1	10.0			
OUTL3 DGRA 79049	1	10.0			
OUTL3 DGRA 79050	1	10.0			
OUTL3 DGRA 79051	1	10.0			
OUTL3 DGRA 79052	1	23.4			
OUTL3 DGRA 79053	1	36.9			
OUTL3 DGRA 79054	1	36.9			
OUTL3 DGRA 79055	1	36.9			
OUTL3 DGRA 79056	1	36.9			
OUTL3 DGRA 79057	1	36.9			
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OUTL3 DGRA 79059	1	36.9			
OUTL3 DGRA 79060	1	36.9			
OUTL3 DGRA 79061	1	36.9			
OUTL3 DGRA 79062	1	36.9			
OUTL3 DGRA 79063	1	36.9			
OUTL3 DGRA 79064	1	72.3			
OUTL3 DGRA 79065	1	151.6			
OUTL3 DGRA 79066	1	151.6			
OUTL3 DGRA 79067	1	151.6			
OUTL3 DGRA 79068	1	151.6			
OUTL3 DGRA 79069	1	151.6			
OUTL3 DGRA 79070	1	151.6			
OUTL3 DGRA 79071	1	63.3			
OUTL3 DGRA 79072	1	8.8			
OUTL3 DGRA 79073	1	4.7	2	3	2.8
OUTL3 DGRA 79074	1		2	3	10.0
OUTL3 DGRA 79075	1		2	3	10.0
OUTL3 DGRA 79076	1		2	3	10.0
OUTL3 DGRA 79077	1		2	3	10.0
OUTL3 DGRA 79078	1		2	3	10.0
OUTL3 DGRA 79079	1		2	3	10.0
OUTL3 DGRA 79080	1		2	3	31.0
OUTL3 DGRA 79081	1		2	3	66.7
OUTL3 DGRA 79082	1		2	3	66.7
OUTL3 DGRA 79083	1		2	3	66.7
OUTL3 DGRA 79084	1		2	3	66.7
OUTL3 DGRA 79085	1		2	3	66.7
OUTL3 DGRA 79086	1		2	3	66.7
OUTL3 DGRA 79087	1		2	3	31.3
OUTL3 DGRA 79088	1		2	3	6.2
OUTL3 DGRA 79089	1		2	3	49.7
OUTL3 DGRA 79090	1		2	3	95.0

OUTL3	DGRA	79091	1	2	3	94.4
OUTL3	DGRA	79092	1	2	3	62.4
OUTL3	DGRA	79093	1	2	3	58.1
OUTL3	DGRA	79094	1	2	3	97.4
OUTL3	DGRA	79095	1	2	3	154.2
OUTL3	DGRA	79096	1	2	3	59.4
OUTL3	DGRA	79097	1	2	3	10.0
OUTL3	DGRA	79098	1	2	3	10.0
OUTL3	DGRA	79099	1	2	3	62.4
OUTL3	DGRA	79100	1	2	3	155.2
OUTL3	DGRA	79101	1	2	3	156.1
OUTL3	DGRA	79102	1	2	3	157.3
OUTL3	DGRA	79103	1	2	3	157.1
OUTL3	DGRA	79104	1	2	3	157.4
OUTL3	DGRA	79105	1	2	3	158.5
OUTL3	DGRA	79106	1	2	3	157.7
OUTL3	DGRA	79107	1	2	3	139.2
OUTL3	DGRA	79108	1	2	3	89.6
OUTL3	DGRA	79109	1	2	3	75.3
OUTL3	DGRA	79110	1	2	3	62.4
OUTL3	DGRA	79111	1	2	3	10.6
OUTL3	DGRA	79112	1	2	3	10.2
OUTL3	DGRA	79113	1	2	3	88.8
OUTL3	DGRA	79114	1	2	3	93.6
OUTL3	DGRA	79115	1	2	3	84.5
OUTL3	DGRA	79116	1	2	3	81.6
OUTL3	DGRA	79117	1	2	3	68.0
OUTL3	DGRA	79118	1	2	3	61.5
OUTL3	DGRA	79119	1	2	3	59.3
OUTL3	DGRA	79120	1	2	3	34.4
OUTL3	DGRA	79121	1	2	3	48.8
OUTL3	DGRA	79122	1	2	3	30.4
OUTL3	DGRA	79123	1	2	3	41.9
OUTL3	DGRA	79124	1	2	3	87.3
OUTL3	DGRA	79125	1	2	3	81.8
OUTL3	DGRA	79126	1	2	3	102.5
OUTL3	DGRA	79127	1	2	3	86.1
OUTL3	DGRA	79128	1	2	3	83.5
OUTL3	DGRA	79129	1	2	3	70.0
OUTL3	DGRA	79130	1	2	3	61.6
OUTL3	DGRA	79131	1	2	3	28.9
OUTL3	DGRA	79132	1	2	3	27.1
OUTL3	DGRA	79133	1	2	3	47.7
OUTL3	DGRA	79134	1	2	3	39.4
OUTL3	DGRA	79135	1	2	3	38.9
OUTL3	DGRA	79136	1	2	3	35.4
OUTL3	DGRA	79137	1	2	3	69.3
OUTL3	DGRA	79138	1	2	3	0.4
OUTL3	DGRA	79139	1	2	3	0.4
OUTL3	DGRA	79140	1	2	3	0.4
OUTL3	DGRA	79141	1	2	3	23.2
OUTL3	DGRA	79142	1	2	3	139.6
OUTL3	DGRA	79143	1	2	3	138.3
OUTL3	DGRA	79144	1	2	3	143.1
OUTL3	DGRA	79145	1	2	3	81.0
OUTL3	DGRA	79146	1	2	3	138.4
OUTL3	DGRA	79147	1	2	3	141.8
OUTL3	DGRA	79148	1	2	3	137.2
OUTL3	DGRA	79149	1	2	3	135.2
OUTL3	DGRA	79150	1	2	3	131.2

OUTL3	DGRA	79151	1	2	3	32.8
OUTL3	DGRA	79152	1	2	3	65.1
OUTL3	DGRA	79153	1	2	3	50.8
OUTL3	DGRA	79154	1	2	3	141.0
OUTL3	DGRA	79155	1	2	3	129.6
OUTL3	DGRA	79156	1	2	3	62.7
OUTL3	DGRA	79157	1	2	3	55.3
OUTL3	DGRA	79158	1	2	3	69.4
OUTL3	DGRA	79159	1	2	3	49.2
OUTL3	DGRA	79160	1	2	3	48.4
OUTL3	DGRA	79161	1	2	3	0.4
OUTL3	DGRA	79162	1	2	3	18.8
OUTL3	DGRA	79163	1	2	3	27.1
OUTL3	DGRA	79164	1	2	3	18.6
OUTL3	DGRA	79165	1	2	3	0.4
OUTL3	DGRA	79166	1	2	3	0.4
OUTL3	DGRA	79167	1	2	3	0.4
OUTL3	DGRA	79168	1	2	3	1.2
OUTL3	DGRA	79169	1	2	3	28.3
OUTL3	DGRA	79170	1	2	3	55.3
OUTL3	DGRA	79171	1	2	3	30.0
OUTL3	DGRA	79172	1	2	3	0.4
OUTL3	DGRA	79173	1	2	3	3.3
OUTL3	DGRA	79174	1	2	3	0.4
OUTL3	DGRA	79175	1	2	3	0.4
OUTL3	DGRA	79176	1	2	3	0.4
OUTL3	DGRA	79177	1	2	3	13.1
OUTL3	DGRA	79178	1	2	3	8.3
OUTL3	DGRA	79179	1	2	3	18.9
OUTL3	DGRA	79180	1	2	3	18.3
OUTL3	DGRA	79181	1	2	3	0.4
OUTL3	DGRA	79182	1	2	3	0.4
OUTL3	DGRA	79183	1	2	3	0.4
OUTL3	DGRA	79184	1	2	3	28.6
OUTL3	DGRA	79185	1	2	3	0.4
OUTL3	DGRA	79186	1	2	3	0.4
OUTL3	DGRA	79187	1	2	3	0.4
OUTL3	DGRA	79188	1	2	3	0.4
OUTL3	DGRA	79189	1	2	3	0.4
OUTL3	DGRA	79190	1	2	3	0.4
OUTL3	DGRA	79191	1	2	3	17.6
OUTL3	DGRA	79192	1	2	3	0.4
OUTL3	DGRA	79193	1	2	3	0.4
OUTL3	DGRA	79194	1	2	3	0.4
OUTL3	DGRA	79195	1	2	3	0.4
OUTL3	DGRA	79196	1	2	3	0.4
OUTL3	DGRA	79197	1	2	3	2.7
OUTL3	DGRA	79198	1	2	3	14.2
OUTL3	DGRA	79199	1	2	3	0.4
OUTL3	DGRA	79200	1	2	3	0.4
OUTL3	DGRA	79201	1	2	3	0.4
OUTL3	DGRA	79202	1	2	3	0.4
OUTL3	DGRA	79203	1	2	3	17.3
OUTL3	DGRA	79204	1	2	3	0.4
OUTL3	DGRA	79205	1	2	3	10.6
OUTL3	DGRA	79206	1	2	3	0.4
OUTL3	DGRA	79207	1	2	3	0.4
OUTL3	DGRA	79208	1	2	3	0.4
OUTL3	DGRA	79209	1	2	3	0.4
OUTL3	DGRA	79210	1	2	3	5.2

OUTL3 DGRA 79211	1	2	3	43.9
OUTL3 DGRA 79212	1	2	3	19.5
OUTL3 DGRA 79213	1	2	3	0.4
OUTL3 DGRA 79214	1	2	3	0.4
OUTL3 DGRA 79215	1	2	3	19.8
OUTL3 DGRA 79216	1	2	3	29.5
OUTL3 DGRA 79217	1	2	3	14.8
OUTL3 DGRA 79218	1	2	3	51.6
OUTL3 DGRA 79219	1	2	3	44.6
OUTL3 DGRA 79220	1	2	3	32.5
OUTL3 DGRA 79221	1	2	3	20.7
OUTL3 DGRA 79222	1	2	3	21.5
OUTL3 DGRA 79223	1	2	3	0.4
OUTL3 DGRA 79224	1	2	3	0.4
OUTL3 DGRA 79225	1	2	3	1.8
OUTL3 DGRA 79226	1	2	3	0.4
OUTL3 DGRA 79227	1	2	3	0.4
OUTL3 DGRA 79228	1	2	3	0.4
OUTL3 DGRA 79229	1	2	3	1.7
OUTL3 DGRA 79230	1	2	3	8.0
OUTL3 DGRA 79231	1	2	3	2.5
OUTL3 DGRA 79232	1	2	3	2.7
OUTL3 DGRA 79233	1	2	3	34.3
OUTL3 DGRA 79234	1	2	3	0.4
OUTL3 DGRA 79235	1	2	3	0.4
OUTL3 DGRA 79236	1	2	3	0.4
OUTL3 DGRA 79237	1	2	3	0.4
OUTL3 DGRA 79238	1	2	3	0.4
OUTL3 DGRA 79239	1	2	3	0.4
OUTL3 DGRA 79240	1	2	3	11.5
OUTL3 DGRA 79241	1	2	3	39.2
OUTL3 DGRA 79242	1	2	3	25.0
OUTL3 DGRA 79243	1	2	3	11.6
OUTL3 DGRA 79244	1	2	3	0.4
OUTL3 DGRA 79245	1	2	3	0.4
OUTL3 DGRA 79246	1	2	3	0.4
OUTL3 DGRA 79247	1	2	3	21.7
OUTL3 DGRA 79248	1	2	3	14.7
OUTL3 DGRA 79249	1	2	3	27.1
OUTL3 DGRA 79250	1	2	3	72.8
OUTL3 DGRA 79251	1	2	3	58.8
OUTL3 DGRA 79252	1	2	3	65.3
OUTL3 DGRA 79253	1	2	3	13.5
OUTL3 DGRA 79254	1	2	3	39.6
OUTL3 DGRA 79255	1	2	3	52.7
OUTL3 DGRA 79256	1	2	3	0.4
OUTL3 DGRA 79257	1	2	3	0.4
OUTL3 DGRA 79258	1	2	3	0.4
OUTL3 DGRA 79259	1	2	3	0.4
OUTL3 DGRA 79260	1	2	3	0.4
OUTL3 DGRA 79261	1	2	3	0.4
OUTL3 DGRA 79262	1	2	3	0.4
OUTL3 DGRA 79263	1	2	3	0.4
OUTL3 DGRA 79264	1	2	3	12.9
OUTL3 DGRA 79265	1	2	3	0.4
OUTL3 DGRA 79266	1	2	3	0.4
OUTL3 DGRA 79267	1	2	3	23.1
OUTL3 DGRA 79268	1	2	3	41.3
OUTL3 DGRA 79269	1	2	3	1.2
OUTL3 DGRA 79270	1	2	3	0.4

OUTL3	DGRA	79271	1	2	3	31.2
OUTL3	DGRA	79272	1	2	3	0.4
OUTL3	DGRA	79273	1	2	3	1.7
OUTL3	DGRA	79274	1	2	3	37.0
OUTL3	DGRA	79275	1	2	3	27.7
OUTL3	DGRA	79276	1	2	3	38.3
OUTL3	DGRA	79277	1	2	3	10.5
OUTL3	DGRA	79278	1	2	3	17.3
OUTL3	DGRA	79279	1	2	3	0.4
OUTL3	DGRA	79280	1	2	3	0.4
OUTL3	DGRA	79281	1	2	3	39.8
OUTL3	DGRA	79282	1	2	3	0.4
OUTL3	DGRA	79283	1	2	3	0.4
OUTL3	DGRA	79284	1	2	3	0.4
OUTL3	DGRA	79285	1	2	3	0.4
OUTL3	DGRA	79286	1	2	3	0.4
OUTL3	DGRA	79287	1	2	3	5.8
OUTL3	DGRA	79288	1	2	3	42.8
OUTL3	DGRA	79289	1	2	3	29.8
OUTL3	DGRA	79290	1	2	3	0.7
OUTL3	DGRA	79291	1	2	3	12.2
OUTL3	DGRA	79292	1	2	3	0.4
OUTL3	DGRA	79293	1	2	3	0.4
OUTL3	DGRA	79294	1	2	3	11.0
OUTL3	DGRA	79295	1	2	3	30.9
OUTL3	DGRA	79296	1	2	3	0.4
OUTL3	DGRA	79297	1	2	3	8.0
OUTL3	DGRA	79298	1	2	3	0.4
OUTL3	DGRA	79299	1	2	3	0.4
OUTL3	DGRA	79300	1	2	3	0.4
OUTL3	DGRA	79301	1	2	3	0.4
OUTL3	DGRA	79302	1	2	3	17.8
OUTL3	DGRA	79303	1	2	3	33.7
OUTL3	DGRA	79304	1	2	3	3.7
OUTL3	DGRA	79305	1	2	3	8.6
OUTL3	DGRA	79306	1	2	3	6.1
OUTL3	DGRA	79307	1	2	3	0.4
OUTL3	DGRA	79308	1	2	3	7.6
OUTL3	DGRA	79309	1	2	3	2.0
OUTL3	DGRA	79310	1	2	3	8.4
OUTL3	DGRA	79311	1	2	3	26.8
OUTL3	DGRA	79312	1	2	3	0.4
OUTL3	DGRA	79313	1	2	3	0.4
OUTL3	DGRA	79314	1	2	3	8.4
OUTL3	DGRA	79315	1	2	3	21.4
OUTL3	DGRA	79316	1	2	3	13.7
OUTL3	DGRA	79317	1	2	3	25.9
OUTL3	DGRA	79318	1	2	3	22.1
OUTL3	DGRA	79319	1	2	3	15.4
OUTL3	DGRA	79320	1	2	3	1.6
OUTL3	DGRA	79321	1	2	3	0.4
OUTL3	DGRA	79322	1	2	3	0.4
OUTL3	DGRA	79323	1	2	3	0.4
OUTL3	DGRA	79324	1	2	3	0.4
OUTL3	DGRA	79325	1	2	3	9.9
OUTL3	DGRA	79326	1	2	3	0.4
OUTL3	DGRA	79327	1	2	3	0.4
OUTL3	DGRA	79328	1	2	3	0.4
OUTL3	DGRA	79329	1	2	3	0.4
OUTL3	DGRA	79330	1	2	3	8.6

OUTL3 DGRA 79331		1		2		3	9.1		
OUTL3 DGRA 79332		1		2		3	0.4		
OUTL3 DGRA 79333		1		2		3	6.2		
OUTL3 DGRA 79334		1		2		3	10.7		
OUTL3 DGRA 79335		1		2		3	0.4		
OUTL3 DGRA 79336		1		2		3	2.1		
OUTL3 DGRA 79337		1		2		3	29.6		
OUTL3 DGRA 79338		1		2		3	10.4		
OUTL3 DGRA 79339		1		2		3	21.5		
OUTL3 DGRA 79340		1		2		3	0.4		
OUTL3 DGRA 79341		1		2		3	8.2		
OUTL3 DGRA 79342		1		2		3	0.4		
OUTL3 DGRA 79343		1		2		3	0.4		
OUTL3 DGRA 79344		1		2		3	4.4		
OUTL3 DGRA 79345		1		2		3	15.1		
OUTL3 DGRA 79346		1		2		3	4.2		
OUTL3 DGRA 79347		1		2		3	7.6		
OUTL3 DGRA 79348		1		2		3	4.4		
OUTL3 DGRA 79349		1		2		3	0.4		
OUTL3 DGRA 79350		1		2		3	0.4		
OUTL3 DGRA 79351		1		2		3	22.8		
OUTL3 DGRA 79352		1		2		3	5.4		
OUTL3 DGRA 79353		1		2		3	2.3		
OUTL3 DGRA 79354		1		2		3	2.2		
OUTL3 DGRA 79355		1		2		3	8.2		
OUTL3 DGRA 79356		1		2		3	14.2		
OUTL3 DGRA 79357		1		2		3	20.6		
OUTL3 DGRA 79358		1		2		3	81.4		
OUTL3 DGRA 79359		1		2		3	31.6		
OUTL3 DGRA 79360		1		2		3	21.1		
OUTL3 DGRA 79361		1		2		3	29.6		
OUTL3 DGRA 79362		1		2		3	60.7		
OUTL3 DGRA 79363		1		2		3	0.4		
OUTL3 DGRA 79364		1		2		3	2.3		
OUTL3 DGRA 79365		1		2		3	2.2		
QQ1	24	41							
Q2 79 1	105.0	39.0	23.0	17.0	14.0	13.0	12.0	12.0	11.0
Q2 79 10	10.0	9.3	8.7	8.0	7.4	6.8	6.4	6.4	6.5
Q2 79 19	11.8	23.9	23.3	17.9	16.7	13.8	11.7	11.9	11.9
Q2 79 28	10.1	9.1	9.0	8.4	8.3	8.2	9.5	9.4	9.3
Q2 79 37	9.7	10.7	10.0	9.0	8.6	9.4	15.2	20.4	17.7
Q2 79 46	15.1	12.4	10.8	10.2	10.0	10.4	19.0	28.0	29.0
Q2 79 55	42.0	47.0	41.0	36.0	29.0	22.2	29.5	217.7	70.1
Q2 79 64	37.4	24.3	18.3	14.7	12.4	10.7	9.4	8.5	7.9
Q2 79 73	7.4	6.8	6.6	6.4	6.1	12.7	127.2	54.8	30.3
Q2 79 82	25.1	18.4	14.6	12.5	15.0	14.2	16.3	291.7	140.3
Q2 79 91	209.9	189.6	61.3	36.9	23.8	18.0	14.8	28.5	20.0
Q2 79100	16.3	27.0	59.9	28.1	18.2	14.2	11.8	10.2	8.9
Q2 79109	8.1	7.5	7.5	18.0	136.3	66.9	34.8	21.6	15.7
Q2 79118	12.6	10.9	9.5	8.0	7.6	39.6	137.2	52.2	27.8
Q2 79127	18.6	13.6	10.9	9.4	51.7	57.4	28.4	18.2	13.7
Q2*79136	11.1	9.3	8.2	7.4	6.9	69.9	320.0	130.8	54.1
Q2*79145	27.9	18.9	30.2	41.0	42.0	27.0	20.0	15.6	44.5
Q2 79154	73.0	36.3	22.5	20.2	20.1	14.5	11.6	9.7	8.4
Q2 79163	7.5	6.8	6.4	5.9	5.6	5.3	5.1	4.9	4.7
Q2 79172	4.6	4.8	4.9	6.8	9.5	6.5	5.4	4.9	4.7
Q2 79181	4.4	4.3	4.2	4.1	4.0	3.9	3.9	4.2	4.3
Q2 79190	4.2	7.6	5.2	4.5	4.6	4.1	4.0	4.1	4.4
Q2 79199	4.0	3.8	3.7	3.6	3.5	3.4	3.4	3.4	3.5
Q2 79208	14.9	54.3	16.3	10.2	7.9	7.0	6.2	8.3	8.9

Q2 79217	6.7	5.6	5.0	4.6	4.3	4.1	6.8	4.9	4.4
Q2 79226	4.1	4.0	4.7	4.5	4.1	3.9	3.7	3.6	3.6
Q2 79235	3.5	4.4	4.0	3.7	3.6	5.0	5.5	4.3	4.0
Q2 79244	5.2	5.5	4.6	4.2	4.0	3.8	3.9	4.1	3.8
Q2 79253	3.6	3.5	3.4	3.3	3.3	3.2	3.1	3.1	3.1
Q2 79262	3.3	3.9	7.4	7.8	5.7	4.8	4.3	4.0	3.8
Q2 79271	3.6	3.6	3.5	3.4	3.3	3.3	3.2	3.1	3.1
Q2 79280	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.9	3.0
Q2 79289	3.0	3.1	3.3	3.4	3.3	3.2	3.3	3.7	3.5
Q2 79298	3.3	3.3	3.2	3.2	3.7	3.8	8.5	7.9	5.8
Q2 79307	4.9	4.4	4.1	4.0	3.8	3.7	4.1	5.9	5.1
Q2 79316	4.6	4.3	4.1	4.0	3.9	3.8	3.7	3.7	3.8
Q2 79325	6.2	14.7	10.2	8.2	7.0	6.2	5.6	5.2	4.8
Q2 79334	4.6	4.4	4.3	4.1	4.0	3.9	3.9	3.8	3.7
Q2 79343	3.7	3.6	3.6	8.1	22.9	14.4	10.6	9.0	7.7
Q2 79352	6.6	6.0	5.6	5.3	8.5	97.2	160.4	40.8	21.7
Q2 79361	16.0	12.4	10.4	9.2	8.1	0.	0.	0.	0.
WQ1 ALG1	8760	1							
ALG1	0.	0.							
WQ1 ALG2	8760	1							
ALG2	0.	0.							
WQ1 ALG3	8760	1							
ALG3	0.	0.							
WQ1 ALK	168	6							
ALK1	13.	13.	13.	13.	16.	18.	20.	21.	17.
ALK2	13.	18.	24.	17.	10.	16.	19.	22.	24.
ALK3	23.	21.	18.	15.	21.	27.	27.	28.	29.
ALK4	30.	36.	41.	38.	34.	33.	32.	34.	35.
ALK5	38.	41.	41.	41.	46.	46.	48.	49.	42.
ALK6	45.	39.	33.	44.	37.	30.	18.	18.	18.
WQ1 DOC	168	6							
DOC1	4.3	4.3	4.3	4.3	4.1	3.9	3.2	2.5	3.2
DOC2	3.9	6.2	8.5	7.3	6.0	5.7	5.3	6.4	7.4
DOC3	5.1	2.8	4.2	5.6	5.4	5.3	5.1	4.9	4.3
DOC4	3.7	3.0	2.4	2.9	3.4	4.1	4.7	4.0	3.3
DOC5	2.5	1.7	1.7	1.7	3.2	4.7	5.7	5.3	2.4
DOC6	2.2	2.0	2.1	5.2	4.3	3.5	2.7	2.7	2.7
WQ1 NH4	168	6							
NH41	.04	.04	.04	.04	.06	.08	.04	.00	.02
NH42	.04	.08	.12	.06	.00	.00	.00	.00	.00
NH43	.01	.02	.01	.00	.00	.00	.05	.00	.02
NH44	.03	.03	.02	.03	.04	.05	.05	.04	.02
NH45	.01	.00	.01	.02	.02	.02	.02	.00	.00
NH46	.00	.00	.00	.01	.01	.02	.02	.05	.08
WQ1 N3+2	168	6							
N031	.19	.19	.19	.19	.22	.24	.21	.18	.25
N032	.31	.28	.25	.28	.31	.23	.15	.11	.06
N033	.11	.16	.14	.11	.09	.06	.13	.20	.20
N034	.19	.11	.03	.05	.06	.06	.05	.06	.07
N035	.05	.02	.02	.01	.01	.00	.00	.00	.06
N036	.05	.01	.15	.08	.01	.22	.40	.40	.40
WQ1 DUMY	8760	1							
N02	0.	0.							
WQ1 FCOL	168	6							
FCOLI1	4.	4.	4.	4.	18.	31.	20.	8.	30.
FCOLI2	51.	1326.	2600.	1300.	0.	31.	61.	36.	10.
FCOLI3	9.	7.	219.	430.	216.	2.	231.	460.	
FCOLI4	600.	312.	23.	18.	12.	6.	0.	500.	1000.
FCOLI5									
FCOLI6									

WQ1 DET	168	6							
DET1	.67	.67	.67	.67	.56	.44	.67	.89	.1
DET2	1.11	1.00	0.88	.88	.89	.78	.67	.45	.22
DET3	.33	.44	.55	0.66	.66	0.66	1.89	.67	.66
DET4	.66	.66	.67	.56	.45	.78	1.11	.95	.66
DET5	.55	.45	.45	.45	.66	.66	1.1	.66	.66
DET6	.66	.66	.66	.660	.66	.66	.66	.66	.66
WQ1 DO	168	6							
DO1	12.0	12.0	12.0	12.0	12.8	13.6	12.8	12.0	12.5
DO2	12.9	12.9	10.5	10.0	9.4	9.4	9.4	9.1	8.8
DO3	8.7	8.6	8.7	8.8	8.6	8.4	8.2	7.9	7.1
DO4	6.3	6.4	6.5	7.8	9.1	8.1	7.0	6.5	6.0
DO5	6.9	7.8	8.0	8.1	7.5	8.1	7.7	7.8	11.0
DO6	10.8	9.5	10.6	11.5	11.5	14.2	12.7	12.7	12.7
WQ1 PO4	168	6							
PO41	.025	.025	.025	.025	.016	.007	.007	.006	.012
PO42	.017	.023	.029	.024	.018	.015	.012	.009	.005
PO43	.007	.009	.009	.009	.009	.009	.017	.024	.016
PO44	.008	.010	.011	.013	.015	.017	.019	.021	.023
PO45	.017	.011	.011	.011	.011	.010	.014	.018	.012
PO46	.012	.009	.014	.009	.002	.009	.030	.030	.030
WQ1 SIL	8760	1							
SIL	.0	.0							
WQ1 TEMP	24	41							
WQ2 1	6.2	3.5	2.6	3.0	4.0	4.2	3.1	2.1	1.9
WQ2 10	2.4	2.5	2.9	2.2	1.2	1.2	2.0	3.8	4.3
WQ2 19	5.6	6.0	4.3	4.3	3.4	2.4	2.3	2.5	3.1
WQ2 28	2.6	2.2	2.4	2.2	1.4	1.6	2.6	3.2	3.1
WQ2 37	2.5	1.3	2.0	1.5	1.5	2.6	4.8	5.8	5.7
WQ2 46	7.7	7.7	4.7	3.3	3.9	4.1	5.6	7.8	9.6
WQ2 55	8.5	6.0	6.3	6.9	7.9	8.8	8.8	10.1	8.8
WQ2 64	7.8	7.8	9.3	9.1	9.2	9.0	8.7	9.6	11.5
WQ2 73	12.2	10.8	9.7	10.0	11.5	13.1	12.9	12.5	12.0
WQ279 82	11.1	9.7	9.8	10.8	11.7	11.9	12.4	12.7	13.1
WQ279 91	13.7	13.3	13.3	14.4	12.9	11.3	11.5	11.0	12.9
WQ2 100	14.0	13.1	13.1	13.1	13.9	14.3	15.1	14.9	15.5
WQ2 109	16.5	17.2	17.0	17.2	17.3	17.1	16.0	14.5	14.8
WQ2 118	15.9	17.1	15.6	14.8	15.4	15.8	15.6	15.6	15.9
WQ2 127	15.0	14.7	15.4	16.7	18.7	19.7	20.0	17.6	15.9
WQ279136	16.4	17.0	18.1	19.1	19.7	20.1	20.6	21.2	20.0
WQ279145	19.2	19.4	19.0	19.7	19.8	20.7	21.5	22.0	22.0
WQ279154	21.5	21.7	22.0	22.1	23.0	23.7	24.2	24.2	23.5
WQ279163	23.2	23.1	23.2	23.6	23.8	24.2	24.5	24.8	25.5
WQ279172	25.3	24.6	25.2	24.5	23.9	23.8	23.9	24.0	24.8
WQ279181	25.4	25.0	25.6	26.1	26.1	26.7	26.1	25.4	25.7
WQ279190	25.2	24.7	25.2	25.1	25.4	25.8	25.9	26.2	26.4
WQ279199	26.1	25.9	26.0	25.7	25.7	25.9	26.0	26.0	26.1
WQ279208	26.1	26.6	26.9	27.0	27.3	27.7	27.8	27.9	26.8
WQ2 217	25.9	27.2	28.1	28.3	28.6	28.8	27.1	25.2	24.8
WQ2 226	25.6	26.1	26.5	26.4	27.0	27.8	28.1	27.5	27.1
WQ2 235	26.8	25.7	24.4	25.5	26.5	27.2	26.8	27.1	27.7
WQ2 244	27.4	27.4	27.1	27.4	27.4	27.2	26.8	26.0	24.4
WQ279253	23.7	24.0	23.9	24.2	23.0	21.3	20.3	19.9	20.3
WQ2 262	20.7	20.6	20.2	20.5	20.4	20.2	20.0	20.4	20.7
WQ2 271	20.8	21.5	21.9	22.4	21.8	20.6	19.7	17.9	17.6
WQ2 280	17.7	18.7	18.6	16.4	16.0	17.0	18.0	16.5	15.8
WQ2 289	16.4	17.2	18.1	18.6	19.6	20.7	20.6	17.4	15.8
WQ2 298	15.4	15.4	15.7	16.1	16.3	16.6	16.6	14.5	13.5
WQ2 307	12.7	11.8	11.6	12.3	11.4	11.4	12.0	11.4	10.4
WQ2 316	9.3	8.6	8.3	8.4	8.7	9.1	9.5	10.8	12.2

WQ2	325	13.5	13.1	11.1	9.4	9.0	8.8	9.2	8.9	7.2
WQ2	334	5.8	5.1	4.9	4.6	4.7	5.6	6.7	6.7	6.7
WQ2	343	6.3	6.4	7.6	8.1	7.7	7.3	7.1	6.7	5.1
WQ2	352	3.8	4.0	5.5	7.7	9.8	11.6	10.8	9.2	8.7
WQ2	361	8.9	9.1	8.6	7.8	7.5				
WQ1	DS	168	6							
DS1		47.	47.	47.	47.	31.	15.	18.	21.	29.
DS2		36.	51.	65.	62.	59.	54.	49.	47.	45.
DS3		58.	71.	68.	65.	62.	59.	75.	91.	82.
DS4		73.	64.	55.	52.	49.	41.	32.	43.	53.
DS5		62.	71.	46.	21.	51.	51.	67.	91.	60.
DS6		29.	49.	92.	87.	67.	79.	23.	23.	23.
WQ1	SS	168	6							
SS		7.	7.	7.	7.	7.	6.	13.	20.	13.
SS		6.	74.	153.	65.	24.	15.	6.	6.	6
SS		6.	6.	6.	6.	6.	6.	6.	6.	12.
SS		19.	12.	6.	8.	11.	22.	33.	20.	8.
SS		7.	6.	6.	7.	8.	7.	6.	6.	6
SS		6.	6.	8.	13.	8.	6.	6.	6.	6.
WQ1	PH	168	6							
PH1		6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.306.30	
PH2		6.30	6.30	6.30	6.50	6.70	6.90	7.10	7.006.90	
PH3		6.80	6.70	6.50	6.30	6.50	6.70	6.65	6.606.65	
PH4		6.70	6.65	6.60	7.00	7.40	7.00	6.60	7.007.40	
PH5		7.25	7.10	6.85	6.60	7.30	6.80	7.15	7.106.80	
PH6		7.10	7.30	6.90	6.90	6.20	6.30	6.10	6.10 6.1	
WQ1		168	53							
WQ2		0.0	0.0	0.0	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.0	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.0	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.0	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.5	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.4	0.0	0.0	6.0	0.0		
WQ2		0.0	0.0	0.3	0.0	0.0	6.0	0.0		
WQ2		0.0	0.0	0.6	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.8	0.0	0.0	4.0	0.0		
WQ2		0.0	0.0	1.8	0.0	0.0	6.0	0.0		
WQ2		0.0	0.0	2.8	0.0	0.0	7.0	0.0		
WQ2		0.0	0.0	2.1	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	1.4	0.0	0.0	3.0	0.0		
WQ2		0.0	0.0	0.7	0.0	0.0	4.0	0.0		
WQ2		0.0	0.0	0.0	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.0	0.0	0.0	4.0	0.0		
WQ2		0.0	0.0	0.0	0.0	0.0	2.0	0.0		
WQ2		0.0	0.0	0.1	0.0	0.0	3.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2		0.0	0.0	0.4	0.0	0.0	4.0	0.0		
WQ2		0.0	0.0	0.6	0.0	0.0	4.0	0.0		
WQ2		0.0	0.0	0.4	0.0	0.0	4.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	6.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	6.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2		0.0	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2		0.2	0.0	0.2	0.0	0.0	4.0	0.0		

WQ2	0.3	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.2	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.6	0.0	0.0	9.0	0.0		
WQ2	0.0	0.0	1.0	0.0	0.0	13.0	0.0		
WQ2	0.0	0.0	0.6	0.0	0.0	12.0	0.0		
WQ2	0.1	0.0	0.2	0.0	0.0	10.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	9.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	10.0	0.0		
WQ2	0.0	0.0	0.1	0.0	0.0	8.0	0.0		
WQ2	0.0	0.0	0.1	0.0	0.0	5.3	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	6.4	0.0		
WQ2	0.0	0.0	0.1	0.0	0.0	12.0	0.0		
WQ2	0.0	0.0	0.1	0.2	0.0	8.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	7.0	0.0		
WQ2	0.0	0.0	0.0	0.0	0.0	7.0	0.0		
WQ2	0.0	0.0	0.0	0.0	0.0	11.0	0.0		
WQ2	0.0	0.0	0.3	0.0	0.0	8.0	0.0		
WQ2	0.0	0.0	0.7	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.7	0.0	0.0	5.0	0.0		
Q1	24	41							
Q2 79 1	49.4	18.3	10.8	8.0	6.6	6.1	5.6	5.6	5.2
Q2 79 10	4.7	4.4	4.1	3.8	3.5	3.2	3.0	3.0	3.1
Q2 79 19	5.5	11.2	11.0	8.4	7.8	6.5	5.5	5.6	5.6
Q2 79 28	4.7	4.3	4.2	3.9	3.9	3.9	4.5	4.4	4.4
Q2 79 37	4.6	5.0	4.7	4.2	4.0	4.4	7.1	9.6	8.3
Q2 79 46	7.1	5.8	5.1	4.8	4.7	4.9	8.9	13.2	13.6
Q2 79 55	19.7	22.1	19.3	16.9	13.6	10.4	13.9	102.3	32.9
Q2 79 64	17.6	11.4	8.6	6.9	5.8	5.0	4.4	4.0	3.7
Q2 79 73	3.5	3.2	3.1	3.0	2.9	6.0	59.8	25.8	14.2
Q2 79 82	11.8	8.6	6.9	5.9	7.0	6.7	7.7	137.1	65.9
Q2 79 91	98.7	89.1	28.8	17.3	11.2	8.5	7.0	13.4	9.4
Q2 79100	7.7	12.7	28.2	13.2	8.6	6.7	5.5	4.8	4.2
Q2 79109	3.8	3.5	3.5	8.5	64.1	31.4	16.4	10.2	7.4
Q2 79118	5.9	5.1	4.5	3.8	3.6	18.6	64.5	24.5	13.1
Q2 79127	8.7	6.4	5.1	4.4	24.3	27.0	13.3	8.6	6.4
Q2*79136	5.2	4.4	3.9	3.5	3.2	32.9	150.0	61.5	25.4
Q2*79145	13.1	8.9	14.2	19.	20.0	12.7	9.4	7.3	20.9
Q2 79154	34.3	17.1	10.6	9.5	9.4	6.8	5.5	4.6	3.9
Q2 79163	3.5	3.2	3.0	2.8	2.6	2.5	2.4	2.3	2.2
Q2 79172	2.2	2.3	2.3	3.2	4.5	3.1	2.5	2.3	2.2
Q2 79181	2.1	2.0	2.0	1.9	1.9	1.8	1.8	2.0	2.0
Q2 79190	2.0	3.6	2.4	2.1	2.2	1.9	1.9	1.9	2.1
Q2 79199	1.9	1.8	1.7	1.7	1.6	1.6	1.6	1.6	1.6
Q2 79208	7.0	25.5	7.7	4.8	3.7	3.3	2.9	3.9	4.2
Q2 79217	3.1	2.6	2.4	2.2	2.0	1.9	3.2	2.3	2.1
Q2 79226	1.9	1.9	2.2	2.1	1.9	1.8	1.7	1.7	1.7
Q2 79235	1.6	2.1	1.9	1.7	1.7	2.4	2.6	2.0	1.9
Q2 79244	2.4	2.6	2.2	2.0	1.9	1.8	1.8	1.9	1.8
Q2 79253	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5
Q2 79262	1.6	1.8	3.5	3.7	2.7	2.3	2.0	1.9	1.8
Q2 79271	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.5
Q2 79280	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Q2 79289	1.4	1.5	1.6	1.6	1.6	1.5	1.6	1.7	1.6
Q2 79298	1.6	1.6	1.5	1.5	1.7	1.8	4.0	3.7	2.7
Q2 79307	2.3	2.1	1.9	1.9	1.8	1.7	1.9	2.8	2.4
Q2 79316	2.2	2.0	1.9	1.9	1.8	1.8	1.7	1.7	1.8
Q2 79325	2.9	6.9	4.8	3.9	3.3	2.9	2.6	2.4	2.3
Q2 79334	2.2	2.1	2.0	1.9	1.9	1.8	1.8	1.8	1.7
Q2 79343	1.7	1.7	1.7	3.8	10.8	6.8	5.0	4.2	3.6

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Q2 79352      3.1       2.8       2.6       2.5       4.0      45.7      75.4      19.2      10.2
Q2 79361      7.5       5.8       4.9       4.3       3.8      0.        0.        0.        0.
WQ1 ALG1     8760         1
ALG1           0.        0.
WQ1 ALG2     8760         1
ALG2           0.        0.
WQ1 ALG3     8760         1
ALG3           .0        .0
WQ1 ALK       168         6
ALK1          13.       13.       13.       13.       16.       18.       20.       21. 17.
ALK2          13.       18.       24.       17.       10.       16.       19.       22. 24.
ALK3          23.       21.       18.       15.       21.       27.       27.       28. 29.
ALK4          30.       36.       41.       38.       34.       33.       32.       34. 35.
ALK5          38.       41.       41.       41.       46.       46.       48.       49. 42.
ALK6          45.       39.       33.       44.       37.       30.       18.       18. 18.
WQ1 DOC       168         6
DOC1          4.3       4.3       4.3       4.3       4.1       3.9       3.2       2.5 3.2
DOC2          3.9       6.2       8.5       7.3       6.0       5.7       5.3       6.4 7.4
DOC3          5.1       2.8       4.2       5.6       5.4       5.3       5.1       4.9 4.3
DOC4          3.7       3.0       2.4       2.9       3.4       4.1       4.7       4.0 3.3
DOC5          2.5       1.7       1.7       1.7       3.2       4.7       5.7       5.3 2.4
DOC6          2.2       2.0       2.1       5.2       4.3       3.5       2.7       2.7 2.7
WQ1 NH4       168         6
NH41          .04       .04       .04       .04       .06       .08       .04       .00 .02
NH42          .04       .08       .12       .06       .00       .00       .00       .00 .00
NH43          .01       .02       .01       .00       .00       .00       .05       .00 .02
NH44          .03       .03       .02       .03       .04       .05       .05       .04 .02
NH45          .01       .00       .01       .02       .02       .02       .02       .00 .00
NH46          .00       .00       .00       .01       .01       .02       .02       .05 .08
WQ1 N2+3      168         6
N031          .19       .19       .19       .19       .22       .24       .21       .18 .25
N032          .31       .28       .25       .28       .31       .23       .15       .11 .06
N033          .11       .16       .14       .11       .09       .06       .13       .20 .20
N034          .19       .11       .03       .05       .06       .06       .05       .06 .07
N035          .05       .02       .02       .01       .01       .00       .00       .00 .06
N036          .05       .01       .15       .08       .01       .22       .40       .40 .4
WQ1 DUMY     8760         1
N02            0.        0.
WQ1 FCOL      168         6
FCOLI1         4.        4.        4.        4.       18.       31.       20.        8. 30.
FCOLI2        51.     1326.     2600.     1300.       0.        31.       61.       36. 10.
FCOLI3         9.        7.      219.      430.      216.        2.      231.      460.
FCOLI4       600.      312.      23.        18.       12.        6.       0.       500.1000.
FCOLI5
FCOLI6
WQ1 DET       168         6
DET1          .67       .67       .67       .67       .56       .44       .67       .89  .1
DET2         1.11      1.00      0.88       .88       .89       .78       .67       .45 .22
DET3          .33       .44       .55      0.66       .66      0.66      1.89       .67 .66
DET4          .66       .66       .67       .56       .45       .78      1.11       .95 .66
DET5          .55       .45       .45       .45       .66       .66       1.1       .66 .66
DET6          .66       .66       .66      .660       .66       .66       .66       .66 .66
WQ1 DO        168         6
DO1          12.0      12.0      12.0      12.0      12.8      13.6      12.8      12.012.5
DO2          12.9      12.9      10.5      10.0       9.4       9.4       9.4       9.1 8.8
DO3           8.7       8.6       8.7       8.8       8.6       8.4       8.2       7.9 7.1
DO4           6.3       6.4       6.5       7.8       9.1       8.1       7.0       6.5 6.0
DO5           6.9       7.8       8.0       8.1       7.5       8.1       7.7       7.811.0
DO6          10.8       9.5      10.6      11.5      11.5      14.2      12.7      12.7 12.7
WQ1 PO4       168         6
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PO41	.025	.025	.025	.025	.016	.007	.007	.006	.012
PO42	.017	.023	.029	.024	.018	.015	.012	.009	.005
PO43	.007	.009	.009	.009	.009	.009	.017	.024	.016
PO44	.008	.010	.011	.013	.015	.017	.019	.021	.023
PO45	.017	.011	.011	.011	.011	.010	.014	.018	.012
PO46	.012	.009	.014	.009	.002	.009	.030	.030	.03
WQ1 SIL	8760	1							
SIL	.0	.0							
WQ1 TEMP	24	41							
WQ2 1	6.2	3.5	2.6	3.0	4.0	4.2	3.1	2.1	1.9
WQ2 10	2.4	2.5	2.9	2.2	1.2	1.2	2.0	3.8	4.3
WQ2 19	5.6	6.0	4.3	4.3	3.4	2.4	2.3	2.5	3.1
WQ2 28	2.6	2.2	2.4	2.2	1.4	1.6	2.6	3.2	3.1
WQ2 37	2.5	1.3	2.0	1.5	1.5	2.6	4.8	5.8	5.7
WQ2 46	7.7	7.7	4.7	3.3	3.9	4.1	5.6	7.8	9.6
WQ2 55	8.5	6.0	6.3	6.9	7.9	8.8	8.8	10.1	8.8
WQ2 64	7.8	7.8	9.3	9.1	9.2	9.0	8.7	9.6	11.5
WQ2 73	12.2	10.8	9.7	10.0	11.5	13.1	12.9	12.5	12.0
WQ279 82	11.1	9.7	9.8	10.8	11.7	11.9	12.4	12.7	13.1
WQ279 91	13.7	13.3	13.3	14.4	12.9	11.3	11.5	11.0	12.9
WQ2 100	14.0	13.1	13.1	13.1	13.9	14.3	15.1	14.9	15.5
WQ2 109	16.5	17.2	17.0	17.2	17.3	17.1	16.0	14.5	14.8
WQ2 118	15.9	17.1	15.6	14.8	15.4	15.8	15.6	15.6	15.9
WQ2 127	15.0	14.7	15.4	16.7	18.7	19.7	20.0	17.6	15.9
WQ279136	16.4	17.0	18.1	19.1	19.7	20.1	20.6	21.2	20.0
WQ279145	19.2	19.4	19.0	19.7	19.8	20.7	21.5	22.0	22.0
WQ279154	21.5	21.7	22.0	22.1	23.0	23.7	24.2	24.2	23.5
WQ279163	23.2	23.1	23.2	23.6	23.8	24.2	24.5	24.8	25.5
WQ279172	25.3	24.6	25.2	24.5	23.9	23.8	23.9	24.0	24.8
WQ279181	25.4	25.0	25.6	26.1	26.1	26.7	26.1	25.4	25.7
WQ279190	25.2	24.7	25.2	25.1	25.4	25.8	25.9	26.2	26.4
WQ279199	26.1	25.9	26.0	25.7	25.7	25.9	26.0	26.0	26.1
WQ279208	26.1	26.6	26.9	27.0	27.3	27.7	27.8	27.9	26.8
WQ2 217	25.9	27.2	28.1	28.3	28.6	28.8	27.1	25.2	24.8
WQ2 226	25.6	26.1	26.5	26.4	27.0	27.8	28.1	27.5	27.1
WQ2 235	26.8	25.7	24.4	25.5	26.5	27.2	26.8	27.1	27.7
WQ2 244	27.4	27.4	27.1	27.4	27.4	27.2	26.8	26.0	24.4
WQ279253	23.7	24.0	23.9	24.2	23.0	21.3	20.3	19.9	20.3
WQ2 262	20.7	20.6	20.2	20.5	20.4	20.2	20.0	20.4	20.7
WQ2 271	20.8	21.5	21.9	22.4	21.8	20.6	19.7	17.9	17.6
WQ2 280	17.7	18.7	18.6	16.4	16.0	17.0	18.0	16.5	15.8
WQ2 289	16.4	17.2	18.1	18.6	19.6	20.7	20.6	17.4	15.8
WQ2 298	15.4	15.4	15.7	16.1	16.3	16.6	16.6	14.5	13.5
WQ2 307	12.7	11.8	11.6	12.3	11.4	11.4	12.0	11.4	10.4
WQ2 316	9.3	8.6	8.3	8.4	8.7	9.1	9.5	10.8	12.2
WQ2 325	13.5	13.1	11.1	9.4	9.0	8.8	9.2	8.9	7.2
WQ2 334	5.8	5.1	4.9	4.6	4.7	5.6	6.7	6.7	6.7
WQ2 343	6.3	6.4	7.6	8.1	7.7	7.3	7.1	6.7	5.1
WQ2 352	3.8	4.0	5.5	7.7	9.8	11.6	10.8	9.2	8.7
WQ2 361	8.9	9.1	8.6	7.8	7.5				
WQ1 DS	168	6							
DS1	47.	47.	47.	47.	31.	15.	18.	21.	29.
DS2	36.	51.	65.	62.	59.	54.	49.	47.	45.
DS3	58.	71.	68.	65.	62.	59.	75.	91.	82.
DS4	73.	64.	55.	52.	49.	41.	32.	43.	53.
DS5	62.	71.	46.	21.	51.	51.	67.	91.	60.
DS6	29.	49.	92.	87.	67.	79.	23.	23.	23.
WQ1 SS	168	6							
SS	7.	7.	7.	7.	7.	6.	13.	20.	13.
SS	6.	74.	153.	65.	24.	15.	6.	6.	6

SS	6.	6.	6.	6.	6.	6.	6.	6.	12.
SS	19.	12.	6.	8.	11.	22.	33.	20.	8.
SS	7.	6.	6.	7.	8.	7.	6.	6.	6
SS	6.	6.	8.	13.	8.	6.	6.	6.	6.
WQ1 PH	168	6							
PH1	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.306.30	
PH2	6.30	6.30	6.30	6.50	6.70	6.90	7.10	7.006.90	
PH3	6.80	6.70	6.50	6.30	6.50	6.70	6.65	6.606.65	
PH4	6.70	6.65	6.60	7.00	7.40	7.00	6.60	7.007.40	
PH5	7.25	7.10	6.85	6.60	7.30	6.80	7.15	7.106.80	
PH6	7.10	7.30	6.[illegible]	6.90	6.20	6.30	6.10	6.10 6.1	
WQ1	168	53							
WQ2	0.0	0.0	0.0	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.0	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.0	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.0	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.5	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.4	0.0	0.0	6.0	0.0		
WQ2	0.0	0.0	0.3	0.0	0.0	6.0	0.0		
WQ2	0.0	0.0	0.6	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.8	0.0	0.0	4.0	0.0		
WQ2	0.0	0.0	1.8	0.0	0.0	6.0	0.0		
WQ2	0.0	0.0	2.8	0.0	0.0	7.0	0.0		
WQ2	0.0	0.0	2.1	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	1.4	0.0	0.0	3.0	0.0		
WQ2	0.0	0.0	0.7	0.0	0.0	4.0	0.0		
WQ2	0.0	0.0	0.0	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.0	0.0	0.0	4.0	0.0		
WQ2	0.0	0.0	0.0	0.0	0.0	2.0	0.0		
WQ2	0.0	0.0	0.1	0.0	0.0	3.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2	0.0	0.0	0.4	0.0	0.0	4.0	0.0		
WQ2	0.0	0.0	0.6	0.0	0.0	4.0	0.0		
WQ2	0.0	0.0	0.4	0.0	0.0	4.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	6.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	6.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2	0.2	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2	0.3	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.2	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	5.0	0.0		
WQ2	0.0	0.0	0.6	0.0	0.0	9.0	0.0		
WQ2	0.0	0.0	1.0	0.0	0.0	13.0	0.0		
WQ2	0.0	0.0	0.6	0.0	0.0	12.0	0.0		
WQ2	0.1	0.0	0.2	0.0	0.0	10.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	9.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	10.0	0.0		
WQ2	0.0	0.0	0.1	0.0	0.0	8.0	0.0		
WQ2	0.0	0.0	0.1	0.0	0.0	5.3	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	6.4	0.0		
WQ2	0.0	0.0	0.1	0.0	0.0	12.0	0.0		
WQ2	0.0	0.0	0.1	0.2	0.0	8.0	0.0		
WQ2	0.0	0.0	0.2	0.0	0.0	7.0	0.0		

WQ2	0.0	0.0	0.0	0.0	0.0	7.0	0.0
WQ2	0.0	0.0	0.0	0.0	0.0	11.0	0.0
WQ2	0.0	0.0	0.3	0.0	0.0	8.0	0.0
WQ2	0.0	0.0	0.7	0.0	0.0	5.0	0.0
WQ2	0.0	0.0	0.7	0.0	0.0	5.0	0.0

DIAGNOSE 9999999

APPENDIX D: 1980 DATA SET FOR DEGRAY LAKE

```
TITLE                      DEGRAY 1980
TITLE                FOR FINAL VERIFICATION
TITLE
TITLE
TITLE
JOB            1     362      24     720      25      80       1       1
OUTPUT COMPLETE
PHYS1          3       2      60    34.2    93.1       2       0 1.2-09
PHYS2      13000      .5     2.0
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1.      1.
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1.      1.
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1.      1.
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1.      1.
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1.      1.
PHYS2+        1.      1.      1.      1.      1.      1.      1.      1.      1.
PHYS2+        1.      1.      1.      1.      1.      1.
CHOICE SPECIFIED
PHYS3       56.4    31.2
PHYS3       51.8    31.2
PHYS3       44.4    31.2
PHYS4     561.81    2.79
PHYS5      47.70    0.55
MIXING       1.0    0.01  .00004 .000008     2.0
LIGHT       0.45     0.4     .01
DIFC2    2.04-09 1.63-09
ALG1         .10   0.017     .25
ALG2        1.10    0.14    .009    .014    0.12      50     .01     .01
ALG3         0.8     .14    .009     .01     0.1     20.     .02     .02
ALG3A        1.0     .14    .009     .01      .1      54    .001    .001
ALG3++       .05
ALG4           0      26      30      35     0.1     0.1
ALG5           4      26      36      40     0.1     0.1
ALG5+          2      26      32      37     0.1     0.1
PLANT1       1.2      .2      .1     .05      .4      .3      .3
PLANT2       .02     .05     .01    .005     10.     30.      .5
PLANT3        2.     25.     29.     38.      .1      .1
ZOO1         .44     .01    0.50     0.5     0.0     0.0     .50     .14
ZOO2         .30     0.0      20      26      36     0.1     0.1
DET1         .35     4.0      28    0.01
FISH1       .015   0.200   0.030     .37     0.0     0.0     .34     .26
FISH2          1    24.4    28.4    35.2     0.1     0.1      .8     .01     .01
DECAY1      .032    0.08    .009     1.4    .008    .005    .005      .2
DECAY2         2      20    0.12
DECAY3         2      32     0.1
DECAY4         2      32     0.1
SSETL        .05     150     125    .007    .005
TMP         1.04
CHEM        4.57    1.14     1.4     1.1     1.4     1.4    0.15    0.14     2.0
ANAER1       0.5     5.0
ANAER2      0.05    0.02       0       5      35      40     0.1     0.1
ANAER3      0.10       0       5      35      40     0.1     0.1
ANAER4      0.00       0       5      35      40     0.1     0.1
ANAER5      0.05    0.06       0       5      35      40     0.1     0.1
ANAER6      0.10       0       5      35      40     0.1     0.1
ANAER7      0.00     0.0       0       5      35      40     0.1     0.1
ANAER8      0.90       0       5      35      40     0.1     0.1
ANAER9      0.50     0.5       0       5      35      40     0.1     0.1
ANAER10    0.001       0       5      35      40     0.1     0.1
ANAER11  0.00001       0       5      35      40     0.1     0.1
ANAER12     0.30     0.0       0       5      35      40     0.1     0.1
```

ANAER13	0.001	0	5	35	40	0.1	0.1		
ANAER14	0.01	0	5	35	40	0.1	0.1		
INIT0	49								
INIT1	55								
INIT2	0.	0.001	0.0	20.	1.001	0.06	0.001	0.30	1.
INIT3	0.4	9.3	0.8	0.001	100.1	6.4	22.	0.001	5.9
INIT4	0.0	0.0	0.8	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	12.5	0.001	0.0	20.	1.001	0.06	0.001	0.30	1.
INIT3	0.4	9.3	0.8	0.001	100.1	6.4	22.	0.001	5.9
INIT4	0.0	0.0	0.8	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	13.5	0.001	0.0	20.	1.001	0.06	0.001	0.30	1.
INIT3	0.4	9.3	0.8	0.001	100.1	6.4	22.	0.001	5.9
INIT4	0.0	0.0	0.8	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	14.5	0.001	0.0	20.	1.001	0.06	0.001	0.30	1.
INIT3	0.4	9.3	0.8	0.001	100.1	6.4	22.	0.001	5.9
INIT4	0.0	0.0	0.8	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	15.5	0.001	0.0	18.	1.001	0.04	0.001	0.31	0.
INIT3	0.4	9.1	0.8	0.001	100.1	6.4	16.	0.001	5.9
INIT4	0.0	0.0	0.6	0.0	0.1	0.0	4.	0.1	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	16.5	0.001	0.0	18.	1.001	0.04	0.001	0.31	0.
INIT3	0.4	9.1	0.8	0.001	100.1	6.5	16.	0.001	5.9
INIT4	0.0	0.0	0.6	0.0	0.1	0.0	4.	0.1	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	17.5	0.001	0.0	18.	1.001	0.04	0.001	0.31	0.
INIT3	0.4	9.1	0.8	0.001	100.1	6.5	16.	0.001	5.9
INIT4	0.0	0.0	0.6	0.0	0.1	0.0	4.	0.1	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	18.5	0.001	0.0	18.	1.001	0.04	0.001	0.33	0.
INIT3	0.2	9.1	0.8	0.001	100.1	6.5	32.	0.001	5.9
INIT4	0.0	0.0	0.5	0.0	0.1	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	19.5	0.001	0.0	18.	1.001	0.04	0.001	0.33	0.
INIT3	0.2	9.1	0.8	0.001	100.1	6.5	32.	0.001	5.9
INIT4	0.0	0.0	0.5	0.0	0.1	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	20.5	0.001	0.0	19.	1.001	0.04	0.001	0.30	0.
INIT3	0.2	8.7	0.8	0.001	100.1	6.5	16.	0.001	5.9
INIT4	0.0	0.0	0.4	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	21.5	0.001	0.0	19.	1.001	0.04	0.001	0.30	0.
INIT3	0.2	8.7	0.8	0.001	100.1	6.5	16.	0.001	5.9
INIT4	0.0	0.0	0.4	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	22.5	0.001	0.0	19.	1.001	0.04	0.001	0.30	0.
INIT3	0.2	8.7	0.6	0.001	100.1	6.6	16.	0.001	5.9
INIT4	0.0	0.0	0.4	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	23.5	0.001	0.0	19.	1.001	0.04	0.001	0.30	0.
INIT3	0.2	8.7	0.6	0.001	100.1	6.6	16.	0.001	5.9
INIT4	0.0	0.0	0.4	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	24.5	0.001	0.0	19.	1.001	0.04	0.001	0.30	0.
INIT3	0.2	8.7	0.6	0.001	100.1	6.6	16.	0.001	5.9
INIT4	0.0	0.0	0.4	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		

INIT2	25.5	0.001	0.0	20.	1.001	0.05	0.001	0.27	0.
INIT3	0.2	9.6	0.5	0.001	100.1	6.7	30.	0.001	6.0
INIT4	0.0	0.0	0.5	0.0	0.3	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	26.5	0.001	0.0	20.	1.001	0.05	0.001	0.27	0.
INIT3	0.2	9.6	0.4	0.001	100.1	6.7	30.	0.001	6.0
INIT4	0.0	0.0	0.5	0.0	0.3	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	27.5	0.001	0.0	20.	1.001	0.05	0.001	0.27	0.
INIT3	0.2	9.6	0.4	0.001	100.1	6.7	30.	0.001	6.0
INIT4	0.0	0.0	0.5	0.0	0.3	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	28.5	0.001	0.0	20.	1.001	0.05	0.001	0.27	0.
INIT3	0.2	9.6	0.3	0.001	100.1	6.7	30.	0.001	6.0
INIT4	0.0	0.0	0.5	0.0	0.3	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	29.5	0.001	0.0	20.	1.001	0.05	0.001	0.27	0.
INIT3	0.2	9.6	0.3	0.001	100.1	6.8	30.	0.001	6.0
INIT4	0.0	0.0	0.5	0.0	0.3	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	30.5	0.001	0.0	23.	1.001	0.11	0.001	0.12	1.
INIT3	0.7	8.9	0.3	0.002	100.1	6.9	26.	0.001	6.0
INIT4	0.0	0.0	1.2	0.0	0.7	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	31.5	0.001	0.0	23.	1.001	0.11	0.001	0.12	1.
INIT3	0.7	8.9	0.3	0.002	100.1	7.1	26.	0.001	6.0
INIT4	0.0	0.0	1.2	0.0	0.7	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	32.5	0.001	0.0	23.	1.001	0.11	0.001	0.12	1.
INIT3	0.7	8.9	0.3	0.002	100.1	7.2	26.	0.001	6.0
INIT4	0.0	0.0	1.2	0.0	0.7	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	33.5	0.001	0.0	23.	1.001	0.11	0.001	0.12	1.
INIT3	0.7	8.9	0.3	0.002	100.1	7.5	26.	0.001	6.0
INIT4	0.0	0.0	1.2	0.0	0.7	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	34.5	0.001	0.0	23.	1.001	0.11	0.001	0.12	1.
INIT3	0.7	8.9	0.3	0.002	100.1	7.7	26.	0.001	6.0
INIT4	0.0	0.0	1.2	0.0	0.7	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	35.5	0.001	0.0	15.	1.001	0.02	0.001	0.08	0.
INIT3	0.2	9.1	1.2	0.001	100.1	8.8	23.	0.001	6.5
INIT4	0.0	0.0	0.1	0.0	0.2	0.0	3.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	36.5	0.001	0.0	15.	1.001	0.02	0.001	0.08	0.
INIT3	0.2	9.1	5.4	0.001	100.1	8.8	23.	0.001	6.5
INIT4	0.0	0.0	0.1	0.0	0.2	0.0	3.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	37.5	0.001	0.0	15.	1.001	0.02	0.001	0.08	0.
INIT3	0.2	9.1	9.7	0.001	100.1	8.9	23.	0.001	6.5
INIT4	0.0	0.0	0.1	0.0	0.2	0.0	3.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	38.5	0.001	0.0	15.	1.001	0.02	0.001	0.08	0.
INIT3	0.2	9.1	9.8	0.001	100.1	8.9	23.	0.001	6.5
INIT4	0.0	0.0	0.1	0.0	0.2	0.0	3.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	39.5	0.001	0.0	15.	1.001	0.02	0.001	0.08	0.
INIT3	0.2	9.1	9.8	0.001	100.1	8.9	23.	0.001	6.5
INIT4	0.0	0.0	0.1	0.0	0.2	0.0	3.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		

INIT2	40.5	0.001	0.0	16.	1.001	0.04	0.001	0.06	0.
INIT3	0.4	9.1	9.8	0.001	100.1	8.9	0.	0.001	6.5
INIT4	21.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	41.5	0.001	0.0	16.	1.001	0.02	0.001	0.06	0.
INIT3	0.4	9.1	9.8	0.001	100.1	8.9	0.	0.001	6.5
INIT4	21.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	42.5	0.001	0.0	16.	1.001	0.02	0.001	0.06	0.
INIT3	0.4	9.1	9.7	0.001	100.1	8.9	0.	0.001	6.5
INIT4	21.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	43.5	0.001	0.0	16.	1.001	0.02	0.001	0.06	0.
INIT3	0.4	9.1	9.7	0.001	100.1	8.9	0.	0.001	6.5
INIT4	21.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	44.5	0.001	0.0	16.	1.001	0.02	0.001	0.06	0.
INIT3	0.4	9.1	9.7	0.001	100.1	8.9	0.	0.001	6.5
INIT4	21.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	45.5	0.001	0.0	18.	1.001	0.04	0.001	0.08	0.
INIT3	0.7	14.9	9.8	0.001	100.1	8.9	4.	0.001	6.5
INIT4	26.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	46.5	0.001	0.0	18.	1.001	0.04	0.001	0.08	0.
INIT3	0.7	14.9	9.8	0.001	100.1	8.9	4.	0.001	6.5
INIT4	26.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	47.5	0.001	0.0	18.	1.001	0.04	0.001	0.08	0.
INIT3	0.7	14.9	9.8	0.001	100.1	8.9	4.	0.001	6.5
INIT4	26.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	48.5	0.001	0.0	18.	1.001	0.02	0.001	0.08	0.
INIT3	0.2	11.3	9.8	0.001	100.1	8.9	0.	0.001	6.5
INIT4	19.	0.0	0.1	0.0	0.3	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	49.5	0.74	0.0	18.	1.001	0.02	0.001	0.08	0.
INIT3	0.2	11.3	9.8	0.001	100.1	8.9	0.	0.001	6.5
INIT4	19.	0.0	0.1	0.0	0.3	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	50.5	0.83	0.0	16.	1.001	0.04	0.001	0.09	1.
INIT3	0.4	7.3	9.8	0.001	100.1	8.9	3.	0.001	6.5
INIT4	28.	0.0	0.1	0.0	0.3	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	51.5	0.92	0.0	16.	1.001	0.04	0.001	0.09	1.
INIT3	0.4	7.3	9.7	0.001	100.1	8.9	3.	0.001	6.5
INIT4	28.	0.0	0.1	0.0	0.3	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	52.5	0.82	0.0	17.	1.001	0.02	0.001	0.09	0.
INIT3	0.2	10.2	9.8	0.001	100.1	8.9	8.	0.001	6.5
INIT4	0.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	53.5	0.96	0.0	17.	1.001	0.02	0.001	0.09	0.
INIT3	0.2	10.2	9.8	0.001	100.1	8.9	8.	0.001	6.5
INIT4	0.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		
INIT2	54.5	1.06	0.0	16.	1.001	0.02	0.001	0.09	0.
INIT3	0.4	9.3	9.8	0.001	100.1	8.9	13.	0.001	6.5
INIT4	0.	0.0	0.1	0.0	0.2	0.0	4.	0.0	600.0
INIT5	12000.0	0.0	200.0	400.0	1000.0	.001	1.0		

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INIT2       55.5     0.80      0.0      16.    1.001     0.02    0.001     0.09       0.
INIT3        0.4      9.3      9.8    0.001    100.0      8.9      13.    0.001      6.5
INIT4         0.      0.0      0.1      0.0      0.2      0.0       4.      0.0    600.0
INIT5    12000.0      0.0    200.0    400.0   1000.0     .001      1.0
INIT2       56.5     0.54      0.0      15.    1.001     0.01    0.001     0.08       2.
INIT3        0.2     15.6      9.8    0.001    100.1      8.9      13.    0.001      6.5
INIT4         0.      0.0      0.1      0.0      0.2      0.0       4.      0.0    600.0
INIT5    12000.0      0.0    200.0    400.0   1000.0     .001      1.0
INIT2       57.5     0.52      0.0     115.    1.001     0.01    0.001     0.08       2.
INIT3        0.2     15.6      9.8    0.001    100.1      9.0      13.    0.001      6.5
INIT4         0.      0.0      0.1      0.0      0.2      0.0       4.      0.0    600.0
INIT5    12000.0      0.0    200.0    400.0   1000.0     .001      1.0
INIT2       58.5     0.83      0.0      15.    1.001     0.01    0.001     0.09       2.
INIT3        0.4      9.8      9.9    0.001    100.1      9.0      12.    0.001      6.5
INIT4         0.      0.0      0.1      0.0      0.2      0.0       3.      0.0    600.0
INIT5    12000.0      0.0    200.0    400.0   1000.0     .001      1.0
INIT2       59.3     0.86      0.0      15.    1.001     0.01    0.001     0.09       2.
INIT3        0.4      9.8      9.9    0.001    100.1      9.0      12.    0.001      6.5
INIT4         0.      0.0      0.1      0.0      0.2      0.0       3.      0.0    600.0
INIT5    12000.0      0.0    200.0    400.0   1000.0     .001      1.0
INIT PL
FILES    PLTWC   PLDG802 PLDG803 PLDG804   FLUX
ID      DEGRAY 1980 J W SEP 14 82
WEATH1           24      366
W2 LTRCL 80 1 1        0.0      5.9      -.9   1012.2      7.9
W2 LTRCL 80 1 2         .6      7.2       .7   1011.2      5.6
W2 LTRCL 80 1 3        1.0      4.4      1.3   1012.2     17.1
W2 LTRCL 80 1 4         .8      2.8     -3.5   1013.2     12.0
W2 LTRCL 80 1 5         .4      4.4     -2.4   1015.9      6.7
W2 LTRCL 80 1 6         .6      7.6      2.4   1008.2     14.4
W2 LTRCL 80 1 7         .9      3.9     -4.9   1010.3     17.4
W2 LTRCL 80 1 8         .6      1.8     -6.6   1013.9     14.4
W2 LTRCL 80 1 9         .3      1.5     -5.6   1018.0      9.7
W2 LTRCL 80 110         .9      7.4      3.1   1011.5      7.9
W2 LTRCL 80 111         .5     14.4      4.3   1011.2     24.1
W2 LTRCL 80 112         .7      3.7     -9.9   1021.6     13.4
W2 LTRCL 80 113         .3      3.8     -1.7   1009.2      5.6
W2 LTRCL 80 114         .3      7.1      3.6   1011.3      4.2
W2 LTRCL 80 115        1.0     11.9     10.2   1012.9     11.3
W2 LTRCL 80 116        1.0     16.5     13.9   1011.1     12.0
W2 LTRCL 80 117         .4     10.7      5.2   1012.7      9.7
W2 LTRCL 80 118         .1      9.1      5.1   1016.1      6.0
W2 LTRCL 80 119         .5     10.0      6.1   1020.0      7.9
W2 LTRCL 80 120        1.0     10.3      6.1   1022.0     10.9
W2 LTRCL 80 121        1.0      6.4      4.8   1014.1      8.8
W2 LTRCL 80 122         .9      6.8      3.5   1007.6     14.6
W2 LTRCL 80 123        0.0      4.3     -5.0   1010.4     13.7
W2 LTRCL 80 124         .2      9.9      2.6   1004.4     16.7
W2 LTRCL 80 125         .7     10.8      2.2   1002.8     12.7
W2 LTRCL 80 126         .7      8.0      1.3   1008.0     15.3
W2 LTRCL 80 127        1.0      5.2     -5.8   1013.8     12.0
W2 LTRCL 80 128        1.0      2.3     -5.4   1015.7     15.7
W2 LTRCL 80 129        1.0     -1.0     -6.9   1019.1     18.3
W2 LTRCL 80 130        1.0      -.6     -4.5   1014.4     14.1
W2 LTRCL 80 131         .6     -3.0     -8.8   1023.6     18.1
W2 LTRCL 80 2 1         .1     -4.9    -11.4   1025.0     12.0
W2 LTRCL 80 2 2         .7     -2.7     -8.0   1020.0      8.1
W2 LTRCL 80 2 3        1.0       .8     -3.2   1018.5      6.9
W2 LTRCL 80 2 4        1.0      2.3     -3.5   1020.6     14.4
W2 LTRCL 80 2 5         .8      4.4      -.8   1015.3      8.1
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W2	LTRCL	80	2 6	.0	3.9	-5.1	1015.5	12.7
W2	LTRCL	80	2 7	.6	-.3	-6.7	1018.6	17.8
W2	LTRCL	80	2 8	1.0	1.2	-2.5	1016.5	17.8
W2	LTRCL	80	2 9	1.0	.2	-3.9	1013.8	17.4
W2	LTRCL	80	210	.4	-2.5	-7.8	1012.6	11.3
W2	LTRCL	80	211	.7	.8	-4.1	1011.6	13.0
W2	LTRCL	80	212	.4	.1	-7.8	1016.7	11.1
W2	LTRCL	80	213	.2	2.7	-3.9	1016.0	6.0
W2	LTRCL	80	214	.7	9.5	3.8	1016.8	7.4
W2	LTRCL	80	215	1.0	13.8	9.7	1008.8	17.4
W2	LTRCL	80	216	.8	1.5	-7.8	1012.0	25.0
W2	LTRCL	80	217	.0	-3.8	-13.1	1015.1	11.3
W2	LTRCL	80	218	.5	1.6	-7.1	1011.3	9.5
W2	LTRCL	80	219	.8	9.5	3.5	1002.1	10.0
W2	LTRCL	80	220	.8	10.0	7.2	1001.4	10.0
W2	LTRCL	80	221	.5	16.3	5.1	1002.3	13.4
W2	LTRCL	80	222	.3	14.7	4.0	1006.1	9.0
W2	LTRCL	80	223	.1	13.1	5.6	1010.6	12.3
W2	LTRCL	80	224	.5	8.7	2.2	1015.8	16.2
W2	LTRCL	80	225	.1	5.4	-6.3	1019.0	20.6
W2	LTRCL	80	226	.0	1.1	-13.6	1023.1	13.7
W2	LTRCL	80	227	.1	11.0	-5.6	1016.1	10.4
W2	LTRCL	80	228	.3	17.9	2.2	1008.8	19.9
W2	LTRCL	80	229	.7	5.4	-4.1	1012.9	25.9
W2	LTRCL	80	3 1	1.0	-2.4	-10.1	1016.9	27.3
W2	LTRCL	80	3 2	.1	-2.5	-14.8	1023.9	15.7
W2	LTRCL	80	3 3	.5	2.8	-10.9	1015.5	15.0
W2	LTRCL	80	3 4	1.0	10.6	4.3	1005.2	18.3
W2	LTRCL	80	3 5	.3	8.6	-.8	1011.6	17.6
W2	LTRCL	80	3 6	.4	7.5	-1.9	1013.5	10.9
W2	LTRCL	80	3 7	.8	18.2	12.2	1006.9	12.7
W2	LTRCL	80	3 8	.4	17.2	8.2	1009.2	16.0
W2	LTRCL	80	3 9	.1	9.6	2.1	1010.3	11.1
W2	LTRCL	80	310	.1	14.9	1.0	1007.3	8.3
W2	LTRCL	80	311	.7	8.2	-3.6	1011.9	18.3
W2	LTRCL	80	312	1.0	8.0	5.3	998.4	13.2
W2	LTRCL	80	313	.5	11.5	2.8	1006.8	19.2
W2	LTRCL	80	314	.1	8.7	-.8	1020.2	11.8
W2	LTRCL	80	315	.3	10.6	1.9	1018.1	11.8
W2	LTRCL	80	316	.8	13.5	10.3	1009.1	9.3
W2	LTRCL	80	317	.7	11.7	7.2	1009.4	16.4
W2	LTRCL	80	318	.1	8.3	-1.1	1020.7	7.9
W2	LTRCL	80	319	1.0	11.1	4.2	1014.3	10.6
W2	LTRCL	80	320	.8	14.6	10.4	1005.1	14.8
W2	LTRCL	80	321	0.0	11.4	-.8	1015.0	13.4
W2	LTRCL	80	322	.4	10.8	2.8	1014.2	10.4
W2	LTRCL	80	323	.9	11.5	7.6	1005.1	10.4
W2	LTRCL	80	324	.8	10.6	4.7	1003.8	18.1
W2	LTRCL	80	325	1.0	8.7	4.2	1012.9	13.9
W2	LTRCL	80	326	1.0	7.8	3.4	1014.2	13.9
W2	LTRCL	80	327	.9	9.9	5.8	1012.4	14.8
W2	LTRCL	80	328	.5	15.8	10.1	1005.8	12.7
W2	LTRCL	80	329	.6	13.6	10.9	1004.2	12.0
W2	LTRCL	80	330	.6	9.5	4.4	998.3	19.2
W2	LTRCL	80	331	.7	11.3	4.0	1008.2	15.3
W2	LTRCL	80	4 1	.1	14.1	7.8	1011.3	15.3
W2	LTRCL	80	4 2	.3	17.5	10.3	1010.8	12.3
W2	LTRCL	80	4 3	.7	19.4	10.7	1010.2	14.6
W2	LTRCL	80	4 4	.1	14.6	.6	1015.8	17.1
W2	LTRCL	80	4 5	.1	13.8	1.9	1017.7	14.4

W2	LTRCL	80	4 6	.6	17.2	5.3	1010.3	12.5
W2	LTRCL	80	4 7	.9	20.8	13.8	1006.1	19.9
W2	LTRCL	80	4 8	.3	17.0	6.7	1009.3	23.6
W2	LTRCL	80	4 9	.1	15.4	-.8	1012.8	19.7
W2	LTRCL	80	410	.2	16.9	.6	1010.5	13.0
W2	LTRCL	80	411	.8	18.9	11.3	1006.5	12.7
W2	LTRCL	80	412	1.0	12.7	6.2	1010.0	18.8
W2	LTRCL	80	413	1.0	6.3	3.1	1004.2	25.2
W2	LTRCL	80	414	.8	5.1	-.0	1001.8	21.1
W2	LTRCL	80	415	0.0	11.9	.8	1009.9	12.7
W2	LTRCL	80	416	.1	14.6	6.5	1016.6	8.6
W2	LTRCL	80	417	.6	15.0	8.7	1015.1	11.3
W2	LTRCL	80	418	.6	14.9	9.5	1016.1	8.8
W2	LTRCL	80	419	0.0	18.1	8.5	1018.2	5.8
W2	LTRCL	80	420	.3	19.9	9.9	1017.7	7.4
W2	LTRCL	80	421	0.0	22.2	10.2	1016.1	7.6
W2	LTRCL	80	422	.0	22.7	11.8	1015.0	8.6
W2	LTRCL	80	423	.2	23.0	11.2	1011.3	13.9
W2	LTRCL	80	424	.4	21.0	13.4	1005.4	11.6
W2	LTRCL	80	425	1.0	13.1	10.1	1004.7	18.8
W2	LTRCL	80	426	1.0	12.2	7.8	1005.5	12.5
W2	LTRCL	80	427	.6	14.9	6.3	1011.8	15.7
W2	LTRCL	80	428	.3	18.5	6.6	1010.2	15.3
W2	LTRCL	80	429	.1	19.0	6.3	1006.7	11.6
W2	LTRCL	80	430	.7	18.1	10.5	1006.4	5.3
W2	LTRCL	80	5 1	1.0	17.4	14.0	1009.7	5.1
W2	LTRCL	80	5 2	.9	18.3	13.5	1012.2	4.4
W2	LTRCL	80	5 3	.7	19.4	14.2	1013.9	9.5
W2	LTRCL	80	5 4	.2	19.8	12.8	1014.1	5.1
W2	LTRCL	80	5 5	.4	21.0	12.6	1012.7	11.3
W2	LTRCL	80	5 6	.3	22.2	14.0	1010.6	8.6
W2	LTRCL	80	5 7	.7	19.4	17.0	1008.4	13.0
W2	LTRCL	80	5 8	.7	16.2	9.7	1011.3	10.0
W2	LTRCL	80	5 9	.1	15.0	5.9	1011.8	10.6
W2	LTRCL	80	510	.3	20.3	13.6	1006.5	17.1
W2	LTRCL	80	511	.8	24.3	21.0	1008.3	17.8
W2	LTRCL	80	512	.9	21.0	20.6	1008.8	13.2
W2	LTRCL	80	513	.7	22.2	19.9	1010.8	11.3
W2	LTRCL	80	514	.8	18.2	13.1	1013.4	17.4
W2	LTRCL	80	515	.9	15.8	14.2	1010.9	18.5
W2	LTRCL	80	516	1.0	20.4	19.2	1008.3	13.2
W2	LTRCL	80	517	.5	23.3	17.8	1011.3	12.3
W2	LTRCL	80	518	.4	22.5	18.5	1014.4	8.3
W2	LTRCL	80	519	.9	20.6	17.9	1013.9	8.6
W2	LTRCL	80	520	.5	21.0	15.8	1013.0	4.2
W2	LTRCL	80	521	1.0	19.0	17.7	1012.5	11.3
W2	LTRCL	80	522	1.0	17.9	16.9	1009.0	12.7
W2	LTRCL	80	523	.8	19.7	16.1	1007.3	12.5
W2	LTRCL	80	524	.4	22.4	17.9	1007.9	5.6
W2	LTRCL	80	525	.5	25.6	21.5	1007.6	5.1
W2	LTRCL	80	526	.1	25.3	19.4	1012.5	6.5
W2	LTRCL	80	527	.4	24.5	17.8	1015.9	7.4
W2	LTRCL	80	528	.6	22.4	18.1	1015.4	4.4
W2	LTRCL	80	529	.9	24.1	20.6	1014.4	9.5
W2	LTRCL	80	530	.6	26.0	19.4	1013.8	16.7
W2	LTRCL	80	531	.5	26.7	20.5	1015.9	13.9
W2	LTRCL	80	6 1	.6	26.4	20.4	1012.9	19.2
W2	LTRCL	80	6 2	.7	26.5	20.3	1012.4	18.3
W2	LTRCL	80	6 3	.5	26.3	20.7	1016.4	10.4
W2	LTRCL	80	6 4	.5	27.6	21.0	1017.8	10.9

W2	LTRCL	80	6 5	.3	27.2	20.0	1015.4	10.6
W2	LTRCL	80	6 6	.5	27.4	21.5	1014.3	13.0
W2	LTRCL	80	6 7	.5	27.9	22.6	1014.9	15.5
W2	LTRCL	80	6 8	.8	24.9	18.3	1019.0	18.3
W2	LTRCL	80	6 9	.4	21.0	11.1	1017.9	11.6
W2	LTRCL	80	610	.1	22.7	12.8	1014.7	10.4
W2	LTRCL	80	611	.2	24.0	15.8	1018.5	10.4
W2	LTRCL	80	612	.4	22.1	10.4	1019.8	8.1
W2	LTRCL	80	613	.0	24.0	14.4	1017.0	8.1
W2	LTRCL	80	614	0.0	26.6	16.8	1015.3	13.0
W2	LTRCL	80	615	.1	27.4	19.2	1014.0	14.8
W2	LTRCL	80	616	.5	26.2	20.8	1015.9	15.0
W2	LTRCL	80	617	.9	21.1	19.0	1016.9	10.9
W2	LTRCL	80	618	.7	24.9	21.0	1014.3	4.2
W2	LTRCL	80	619	.6	24.8	20.9	1012.7	6.0
W2	LTRCL	80	620	.8	21.2	18.5	1014.6	10.6
W2	LTRCL	80	621	.6	23.3	17.0	1015.2	7.4
W2	LTRCL	80	622	.6	25.6	19.7	1014.6	8.1
W2	LTRCL	80	623	.6	26.3	21.7	1013.3	10.6
W2	LTRCL	80	624	.7	28.5	23.5	1011.3	10.9
W2	LTRCL	80	625	.7	29.9	25.3	1013.1	7.2
W2	LTRCL	80	626	.5	31.0	25.3	1014.4	11.3
W2	LTRCL	80	627	.2	31.0	24.9	1015.1	10.6
W2	LTRCL	80	628	.1	31.6	23.9	1013.6	15.7
W2	LTRCL	80	629	.3	31.2	23.8	1014.1	12.5
W2	LTRCL	80	630	.3	30.8	23.3	1016.4	11.3
W2	LTRCL	80	7 1	.1	31.8	23.8	1016.2	13.4
W2	LTRCL	80	7 2	.1	31.9	23.4	1017.6	12.7
W2	LTRCL	80	7 3	.3	31.7	23.8	1016.9	12.0
W2	LTRCL	80	7 4	0.0	30.6	21.9	1017.7	14.4
W2	LTRCL	80	7 5	.1	30.9	22.3	1018.5	13.2
W2	LTRCL	80	7 6	.1	32.0	22.4	1019.3	9.5
W2	LTRCL	80	7 7	.1	32.2	22.8	1019.2	10.4
W2	LTRCL	80	7 8	.1	32.7	22.8	1019.2	12.3
W2	LTRCL	80	7 9	.2	32.2	22.6	1018.9	12.0
W2	LTRCL	80	710	.4	33.0	21.3	1018.4	10.6
W2	LTRCL	80	711	0.0	33.1	19.5	1017.2	13.0
W2	LTRCL	80	712	.0	32.6	19.8	1016.2	13.9
W2	LTRCL	80	713	0.0	34.2	20.1	1016.8	11.3
W2	LTRCL	80	714	.0	34.0	19.0	1017.2	12.7
W2	LTRCL	80	715	.0	33.7	20.8	1017.8	10.9
W2	LTRCL	80	716	0.0	33.5	19.9	1016.5	13.2
W2	LTRCL	80	717	.5	32.1	19.7	1014.9	10.9
W2	LTRCL	80	718	.2	32.1	19.2	1015.4	10.0
W2	LTRCL	80	719	.1	30.6	20.1	1016.9	8.8
W2	LTRCL	80	720	.1	30.1	20.6	1016.7	9.0
W2	LTRCL	80	721	.8	26.1	21.9	1015.0	13.9
W2	LTRCL	80	722	.6	28.5	20.4	1014.9	17.4
W2	LTRCL	80	723	.1	27.4	17.2	1014.9	11.6
W2	LTRCL	80	724	.1	27.0	17.2	1015.1	11.8
W2	LTRCL	80	725	.0	26.8	17.3	1015.4	6.7
W2	LTRCL	80	726	.5	26.9	20.2	1013.9	9.3
W2	LTRCL	80	727	.7	26.1	21.7	1011.8	11.8
W2	LTRCL	80	728	.5	27.1	21.8	1013.4	6.5
W2	LTRCL	80	729	.3	29.4	20.1	1015.1	9.0
W2	LTRCL	80	730	.1	31.7	20.6	1015.3	7.2
W2	LTRCL	80	731	.1	32.6	20.2	1017.2	10.2
W2	LTRCL	80	8 1	.2	31.4	20.2	1016.3	10.4
W2	LTRCL	80	8 2	.0	30.8	20.6	1013.5	18.8
W2	LTRCL	80	8 3	.8	29.9	22.0	1010.4	16.0

W2	LTRCL	80 8 4	.7	29.6	21.4	1012.0	17.1
W2	LTRCL	80 8 5	.5	29.7	22.2	1016.4	16.4
W2	LTRCL	80 8 6	.3	31.1	21.2	1020.4	12.5
W2	LTRCL	80 8 7	.1	31.0	21.4	1020.2	10.0
W2	LTRCL	80 8 8	.1	31.5	21.9	1018.1	9.7
W2	LTRCL	80 8 9	.3	30.3	21.8	1015.6	6.3
W2	LTRCL	80 810	.7	30.3	21.4	1014.1	10.2
W2	LTRCL	80 811	.5	31.1	20.0	1015.3	10.6
W2	LTRCL	80 812	.4	31.3	21.4	1016.5	11.8
W2	LTRCL	80 813	.5	30.1	21.7	1016.0	9.3
W2	LTRCL	80 814	.4	29.6	22.2	1014.3	11.3
W2	LTRCL	80 815	.3	31.0	21.3	1014.5	14.4
W2	LTRCL	80 816	.3	30.8	20.6	1014.5	15.3
W2	LTRCL	80 817	.1	31.4	19.4	1017.1	13.4
W2	LTRCL	80 818	.1	31.5	19.5	1017.8	12.0
W2	LTRCL	80 819	.1	31.6	19.7	1017.2	13.4
W2	LTRCL	80 820	.1	31.0	18.3	1014.7	13.0
W2	LTRCL	80 821	.2	31.5	17.3	1015.3	8.8
W2	LTRCL	80 822	0.0	28.2	13.8	1018.5	13.0
W2	LTRCL	80 823	0.0	26.8	14.2	1019.7	11.1
W2	LTRCL	80 824	0.0	26.5	17.4	1018.5	8.6
W2	LTRCL	80 825	.1	29.0	18.1	1018.0	5.6
W2	LTRCL	80 826	.2	29.5	17.7	1017.9	7.9
W2	LTRCL	80 827	.4	29.3	18.1	1018.7	10.2
W2	LTRCL	80 828	.4	26.5	17.5	1019.1	8.8
W2	LTRCL	80 829	.3	25.1	19.6	1017.8	8.6
W2	LTRCL	80 830	.3	26.5	19.8	1016.3	11.6
W2	LTRCL	80 831	.2	29.1	19.9	1015.8	15.7
W2	LTRCL	80 9 1	.2	30.3	20.1	1016.8	16.4
W2	LTRCL	80 9 2	.5	26.8	21.0	1017.6	10.4
W2	LTRCL	80 9 3	.4	27.2	20.6	1018.2	7.9
W2	LTRCL	80 9 4	.2	29.2	19.5	1019.5	8.8
W2	LTRCL	80 9 5	.2	28.9	19.4	1020.9	9.0
W2	LTRCL	80 9 6	.1	28.5	19.4	1020.1	5.3
W2	LTRCL	80 9 7	.2	29.2	19.3	1018.4	7.6
W2	LTRCL	80 9 8	.6	28.0	18.5	1018.3	6.9
W2	LTRCL	80 9 9	.2	28.6	17.8	1019.6	8.6
W2	LTRCL	80 910	.3	27.9	17.3	1019.7	15.7
W2	LTRCL	80 911	.1	25.9	13.1	1016.0	9.5
W2	LTRCL	80 912	.3	28.5	16.2	1014.4	9.0
W2	LTRCL	80 913	.3	29.4	16.2	1016.6	9.0
W2	LTRCL	80 914	.5	28.8	16.3	1017.2	12.3
W2	LTRCL	80 915	.6	26.5	17.5	1013.9	11.1
W2	LTRCL	80 916	.4	29.9	16.6	1009.3	14.1
W2	LTRCL	80 917	.8	21.9	15.7	1011.1	16.4
W2	LTRCL	80 918	.5	20.5	15.1	1016.2	10.4
W2	LTRCL	80 919	.1	24.4	15.3	1017.9	9.3
W2	LTRCL	80 920	.3	26.8	18.4	1015.6	13.9
W2	LTRCL	80 921	.7	28.9	19.7	1014.7	16.0
W2	LTRCL	80 922	.8	30.0	19.5	1014.7	17.4
W2	LTRCL	80 923	.8	23.1	16.5	1015.2	15.5
W2	LTRCL	80 924	1.0	20.6	17.8	1013.4	10.4
W2	LTRCL	80 925	.9	21.7	19.2	1015.8	9.7
W2	LTRCL	80 926	.8	18.9	9.7	1023.1	19.2
W2	LTRCL	80 927	1.0	14.5	10.2	1020.5	11.1
W2	LTRCL	80 928	1.0	13.7	12.2	1014.3	12.0
W2	LTRCL	80 929	1.0	17.5	15.5	1012.1	11.8
W2	LTRCL	80 930	.5	21.5	15.9	1012.2	11.6
W2	LTRCL	8010 1	.1	20.9	15.7	1010.8	10.9
W2	LTRCL	8010 2	.3	20.8	9.6	1013.5	15.3

W2	LTRCL	8010 3	.6	15.1	4.4	1013.7	16.4
W2	LTRCL	8010 4	.4	16.5	6.3	1009.6	16.2
W2	LTRCL	8010 5	0.0	12.4	4.7	1019.3	11.1
W2	LTRCL	8010 6	.1	13.3	5.8	1022.2	6.5
W2	LTRCL	8010 7	0.0	18.0	11.2	1018.0	11.8
W2	LTRCL	8010 8	.0	21.8	14.9	1013.0	13.4
W2	LTRCL	8010 9	.1	22.9	15.1	1011.7	10.9
W2	LTRCL	801010	.2	23.3	14.5	1013.3	14.8
W2	LTRCL	801011	0.0	19.2	3.1	1016.7	12.7
W2	LTRCL	801012	.1	13.4	3.2	1017.8	8.6
W2	LTRCL	801013	0.0	12.7	5.1	1017.5	6.3
W2	LTRCL	801014	.3	15.6	8.3	1014.4	8.1
W2	LTRCL	801015	.4	21.1	12.3	1013.9	14.8
W2	LTRCL	801016	.8	20.8	16.4	1012.1	12.7
W2	LTRCL	801017	.9	21.1	18.6	1008.5	13.0
W2	LTRCL	801018	.9	18.2	13.9	1010.8	6.0
W2	LTRCL	801019	.2	15.3	6.6	1014.5	15.0
W2	LTRCL	801020	.3	13.6	7.2	1015.7	9.3
W2	LTRCL	801021	.0	15.9	10.0	1015.0	10.6
W2	LTRCL	801022	.0	15.8	10.3	1015.3	6.5
W2	LTRCL	801023	.3	16.0	11.1	1015.4	4.4
W2	LTRCL	801024	.7	12.1	5.4	1015.1	19.4
W2	LTRCL	801025	0.0	9.1	1.3	1015.6	13.0
W2	LTRCL	801026	.7	9.2	3.3	1015.5	11.3
W2	LTRCL	801027	.7	14.9	12.4	1004.5	15.7
W2	LTRCL	801028	.8	10.2	6.2	1012.8	19.4
W2	LTRCL	801029	.7	7.8	-.1	1020.6	15.5
W2	LTRCL	801030	.0	6.2	-.3	1021.5	6.7
W2	LTRCL	801031	0.0	10.1	1.9	1020.0	8.1
W2	LTRCL	8011 1	.2	13.8	5.3	1017.8	10.0
W2	LTRCL	8011 2	.5	13.2	6.4	1016.8	5.6
W2	LTRCL	8011 3	.2	15.0	8.8	1015.0	12.3
W2	LTRCL	8011 4	.1	15.2	4.4	1018.1	11.8
W2	LTRCL	8011 5	.2	12.5	3.9	1016.2	10.2
W2	LTRCL	8011 6	0.0	14.2	6.6	1012.3	8.1
W2	LTRCL	8011 7	.1	18.7	10.4	1007.4	18.1
W2	LTRCL	8011 8	.0	18.9	14.0	1006.9	14.8
W2	LTRCL	8011 9	.2	19.8	15.7	1011.2	8.6
W2	LTRCL	801110	.3	16.5	10.6	1016.7	9.5
W2	LTRCL	801111	0.0	11.9	3.8	1020.0	14.1
W2	LTRCL	801112	0.0	11.2	.8	1019.5	10.0
W2	LTRCL	801113	.2	11.6	2.6	1015.6	5.3
W2	LTRCL	801114	1.0	12.1	9.4	1013.4	10.9
W2	LTRCL	801115	1.0	9.9	7.4	1014.7	18.5
W2	LTRCL	801116	1.0	6.3	2.2	1015.2	24.3
W2	LTRCL	801117	1.0	5.3	4.4	1008.3	20.1
W2	LTRCL	801118	.7	4.1	.4	1018.3	17.1
W2	LTRCL	801119	.1	2.4	-1.8	1021.6	6.3
W2	LTRCL	801120	.1	3.8	-1.3	1019.9	7.2
W2	LTRCL	801121	.5	5.6	-.6	1022.6	9.7
W2	LTRCL	801122	1.0	5.4	1.3	1017.8	8.3
W2	LTRCL	801123	1.0	9.0	6.7	1012.7	9.3
W2	LTRCL	801124	.8	8.5	4.7	1017.4	14.6
W2	LTRCL	801125	.4	3.5	-4.7	1022.6	19.0
W2	LTRCL	801126	1.0	2.6	-2.4	1014.9	18.5
W2	LTRCL	801127	.8	2.7	-.6	1007.6	17.6
W2	LTRCL	801128	.4	4.2	-1.7	1009.1	13.4
W2	LTRCL	801129	.1	7.8	-2.3	1014.5	12.3
W2	LTRCL	801130	.3	10.9	4.6	1013.0	13.9
W2	LTRCL	8012 1	.8	16.2	10.9	1010.1	17.4

W2 LTRCL 8012 2	.3	9.6	2.4	1018.2	20.8	
W2 LTRCL 8012 3	.0	1.5	-4.6	1022.7	11.1	
W2 LTRCL 8012 4	.7	8.1	2.8	1017.9	9.0	
W2 LTRCL 8012 5	.9	14.1	9.6	1016.0	11.8	
W2 LTRCL 8012 6	.5	16.3	12.3	1018.6	11.8	
W2 LTRCL 8012 7	.9	15.8	13.0	1018.5	9.3	
W2 LTRCL 8012 8	.9	15.6	13.3	1011.4	18.5	
W2 LTRCL 8012 9	1.0	7.6	4.4	1012.1	18.5	
W2 LTRCL 801210	.8	4.4	-1.5	1019.3	14.8	
W2 LTRCL 801211	.1	4.4	-1.4	1018.3	11.8	
W2 LTRCL 801212	.1	9.3	1.0	1015.3	16.4	
W2 LTRCL 801213	.4	8.8	1.8	1019.0	8.3	
W2 LTRCL 801214	.3	5.1	-1.8	1019.2	4.2	
W2 LTRCL 801215	.5	10.0	.8	1008.4	15.0	
W2 LTRCL 801216	.5	10.4	1.0	1007.3	17.4	
W2 LTRCL 801217	.1	4.9	-1.1	1012.4	9.3	
W2 LTRCL 801218	.1	10.1	4.1	1008.5	9.7	
W2 LTRCL 801219	1.0	4.9	-5.3	1022.0	25.9	
W2 LTRCL 801220	.8	-4.8	-15.6	1029.0	20.1	
W2 LTRCL 801221	0.0	-4.8	-14.0	1027.1	16.4	
W2 LTRCL 801222	.7	-2.2	-10.0	1018.6	6.5	
W2 LTRCL 801223	1.0	4.4	-2.2	1012.8	9.3	
W2 LTRCL 801224	.5	3.6	-3.3	1018.7	21.8	
W2 LTRCL 801225	.5	-6.7	-13.1	1023.6	14.6	
W2 LTRCL 801226	.8	-1.7	-6.3	1015.2	5.1	
W2 LTRCL 801227	.6	1.5	-4.3	1019.1	10.4	
W2 LTRCL 801228	.4	1.5	-4.7	1016.8	4.4	
W2 LTRCL 801229	.4	3.9	-.9	1015.1	12.0	
W2 LTRCL 801230	.1	6.0	-.1	1016.3	10.9	
W2 LTRCL 801231	.2	10.0	-.3	1009.8	12.3	
FHARV1 8784	2					
FHARV2 00	00	00				
FHARV2 00	00	00				
OUTL1 24	366					
OUTL3 DGRA 80 1	1		2		3	24.4
OUTL3 DGRA 80 2	1		2		3	20.3
OUTL3 DGRA 80 3	1		2		3	55.8
OUTL3 DGRA 80 4	1		2		3	1.8
OUTL3 DGRA 80 5	1		2		3	22.5
OUTL3 DGRA 80 6	1		2		3	8.6
OUTL3 DGRA 80 7	1		2		3	2.6
OUTL3 DGRA 80 8	1		2		3	5.6
OUTL3 DGRA 80 9	1		2		3	0.4
OUTL3 DGRA 80 10	1		2		3	15.1
OUTL3 DGRA 80 11	1		2		3	0.4
OUTL3 DGRA 80 12	1		2		3	4.3
OUTL3 DGRA 80 13	1		2		3	1.4
OUTL3 DGRA 80 14	1		2		3	4.2
OUTL3 DGRA 80 15	1		2		3	7.6
OUTL3 DGRA 80 16	1		2		3	21.5
OUTL3 DGRA 80 17	1		2		3	31.8
OUTL3 DGRA 80 18	1		2		3	36.6
OUTL3 DGRA 80 19	1		2		3	0.4
OUTL3 DGRA 80 20	1		2		3	0.4
OUTL3 DGRA 80 21	1		2		3	0.4
OUTL3 DGRA 80 22	1		2		3	11.5
OUTL3 DGRA 80 23	1		2		3	0.4
OUTL3 DGRA 80 24	1		2		3	9.5
OUTL3 DGRA 80 25	1		2		3	7.1
OUTL3 DGRA 80 26	1		2		3	7.8

OUTL3	DGRA	80	27	1	2	3	10.8
OUTL3	DGRA	80	28	1	2	3	9.1
OUTL3	DGRA	80	29	1	2	3	14.8
OUTL3	DGRA	80	30	1	2	3	16.5
OUTL3	DGRA	80	31	1	2	3	63.4
OUTL3	DGRA	80	32	1	2	3	26.1
OUTL3	DGRA	80	33	1	2	3	0.4
OUTL3	DGRA	80	34	1	2	3	0.4
OUTL3	DGRA	80	35	1	2	3	22.8
OUTL3	DGRA	80	36	1	2	3	21.5
OUTL3	DGRA	80	37	1	2	3	25.1
OUTL3	DGRA	80	38	1	2	3	68.5
OUTL3	DGRA	80	39	1	2	3	24.7
OUTL3	DGRA	80	40	1	2	3	6.1
OUTL3	DGRA	80	41	1	2	3	14.4
OUTL3	DGRA	80	42	1	2	3	24.8
OUTL3	DGRA	80	43	1	2	3	11.3
OUTL3	DGRA	80	44	1	2	3	14.7
OUTL3	DGRA	80	45	1	2	3	20.1
OUTL3	DGRA	80	46	1	2	3	0.4
OUTL3	DGRA	80	47	1	2	3	24.7
OUTL3	DGRA	80	48	1	2	3	27.2
OUTL3	DGRA	80	49	1	2	3	21.9
OUTL3	DGRA	80	50	1	2	3	12.5
OUTL3	DGRA	80	51	1	2	3	4.8
OUTL3	DGRA	80	52	1	2	3	11.6
OUTL3	DGRA	80	53	1	2	3	0.4
OUTL3	DGRA	80	54	1	2	3	0.4
OUTL3	DGRA	80	55	1	2	3	0.4
OUTL3	DGRA	80	56	1	2	3	14.7
OUTL3	DGRA	80	57	1	2	3	35.4
OUTL3	DGRA	80	58	1	2	3	0.4
OUTL3	DGRA	80	59	1	2	3	0.4
OUTL3	DGRA	80	60	1	2	3	16.9
OUTL3	DGRA	80	61	1	2	3	28.3
OUTL3	DGRA	80	62	1	2	3	32.6
OUTL3	DGRA	80	63	1	2	3	32.3
OUTL3	DGRA	80	64	1	2	3	28.5
OUTL3	DGRA	80	65	1	2	3	15.5
OUTL3	DGRA	80	66	1	2	3	16.3
OUTL3	DGRA	80	67	1	2	3	23.8
OUTL3	DGRA	80	68	1	2	3	6.1
OUTL3	DGRA	80	69	1	2	3	12.0
OUTL3	DGRA	80	70	1	2	3	0.4
OUTL3	DGRA	80	71	1	2	3	0.4
OUTL3	DGRA	80	72	1	2	3	31.0
OUTL3	DGRA	80	73	1	2	3	23.7
OUTL3	DGRA	80	74	1	2	3	0.4
OUTL3	DGRA	80	75	1	2	3	0.4
OUTL3	DGRA	80	76	1	2	3	0.4
OUTL3	DGRA	80	77	1	2	3	0.4
OUTL3	DGRA	80	78	1	2	3	36.0
OUTL3	DGRA	80	79	1	2	3	78.2
OUTL3	DGRA	80	80	1	2	3	2.4
OUTL3	DGRA	80	81	1	2	3	7.2
OUTL3	DGRA	80	82	1	2	3	0.4
OUTL3	DGRA	80	83	1	2	3	42.7
OUTL3	DGRA	80	84	1	2	3	80.6
OUTL3	DGRA	80	85	1	2	3	18.8
OUTL3	DGRA	80	86	1	2	3	22.4

OUTL3 DGRA 80 87	1	2	3	65.2
OUTL3 DGRA 80 88	1	2	3	30.4
OUTL3 DGRA 80 89	1	2	3	37.7
OUTL3 DGRA 80 90	1	2	3	19.7
OUTL3 DGRA 80 91	1	2	3	43.0
OUTL3 DGRA 80 92	1	2	3	36.6
OUTL3 DGRA 80 93	1	2	3	66.5
OUTL3 DGRA 80 94	1	2	3	33.3
OUTL3 DGRA 80 95	1	2	3	0.4
OUTL3 DGRA 80 96	1	2	3	0.4
OUTL3 DGRA 80 97	1	2	3	17.0
OUTL3 DGRA 80 98	1	2	3	17.4
OUTL3 DGRA 80 99	1	2	3	39.9
OUTL3 DGRA 80100	1	2	3	14.3
OUTL3 DGRA 80101	1	2	3	3.0
OUTL3 DGRA 80102	1	2	3	18.1
OUTL3 DGRA 80103	1	2	3	0.4
OUTL3 DGRA 80104	1	2	3	17.1
OUTL3 DGRA 80105	1	2	3	91.5
OUTL3 DGRA 80106	1	2	3	76.1
OUTL3 DGRA 80107	1	2	3	84.3
OUTL3 DGRA 80108	1	2	3	84.1
OUTL3 DGRA 80109	1	2	3	68.2
OUTL3 DGRA 80110	1	2	3	0.4
OUTL3 DGRA 80111	1	2	3	2.5
OUTL3 DGRA 80112	1	2	3	31.0
OUTL3 DGRA 80113	1	2	3	25.8
OUTL3 DGRA 80114	1	2	3	5.8
OUTL3 DGRA 80115	1	2	3	18.6
OUTL3 DGRA 80116	1	2	3	12.9
OUTL3 DGRA 80117	1	2	3	7.5
OUTL3 DGRA 80118	1	2	3	24.1
OUTL3 DGRA 80119	1	2	3	8.6
OUTL3 DGRA 80120	1	2	3	25.7
OUTL3 DGRA 80121	1	2	3	10.4
OUTL3 DGRA 80122	1	2	3	13.2
OUTL3 DGRA 80123	1	2	3	39.0
OUTL3 DGRA 80124	1	2	3	40.6
OUTL3 DGRA 80125	1	2	3	49.2
OUTL3 DGRA 80126	1	2	3	56.6
OUTL3 DGRA 80127	1	2	3	27.9
OUTL3 DGRA 80128	1	2	3	0.4
OUTL3 DGRA 80129	1	2	3	0.4
OUTL3 DGRA 80130	1	2	3	0.4
OUTL3 DGRA 80131	1	2	3	0.4
OUTL3 DGRA 80132	1	2	3	0.4
OUTL3 DGRA 80133	1	2	3	63.7
OUTL3 DGRA 80134	1	2	3	31.1
OUTL3 DGRA 80135	1	2	3	9.9
OUTL3 DGRA 80136	1	2	3	81.3
OUTL3 DGRA 80137	1	2	3	88.0
OUTL3 DGRA 80138	1	2	3	81.1
OUTL3 DGRA 80139	1	2	3	54.5
OUTL3 DGRA 80140	1	2	3	10.5
OUTL3 DGRA 80141	1	2	3	32.6
OUTL3 DGRA 80142	1	2	3	40.9
OUTL3 DGRA 80143	1	2	3	70.1
OUTL3 DGRA 80144	1	2	3	37.0
OUTL3 DGRA 80145	1	2	3	37.1
OUTL3 DGRA 80146	1	2	3	40.6

OUTL3	DGRA	80147	1	2	3	0.4
OUTL3	DGRA	80148	1	2	3	16.7
OUTL3	DGRA	80149	1	2	3	37.3
OUTL3	DGRA	80150	1	2	3	93.1
OUTL3	DGRA	80151	1	2	3	0.4
OUTL3	DGRA	80152	1	2	3	32.8
OUTL3	DGRA	80153	1	2	3	14.8
OUTL3	DGRA	80154	1	2	3	53.1
OUTL3	DGRA	80155	1	2	3	29.4
OUTL3	DGRA	80156	1	2	3	38.2
OUTL3	DGRA	80157	1	2	3	77.1
OUTL3	DGRA	80158	1	2	3	51.0
OUTL3	DGRA	80159	1	2	3	65.9
OUTL3	DGRA	80160	1	2	3	0.4
OUTL3	DGRA	80161	1	2	3	0.4
OUTL3	DGRA	80162	1	2	3	12.4
OUTL3	DGRA	80163	1	2	3	0.9
OUTL3	DGRA	80164	1	2	3	0.4
OUTL3	DGRA	80165	1	2	3	0.4
OUTL3	DGRA	80166	1	2	3	0.4
OUTL3	DGRA	80167	1	2	3	0.4
OUTL3	DGRA	80168	1	2	3	0.4
OUTL3	DGRA	80169	1	2	3	13.2
OUTL3	DGRA	80170	1	2	3	0.4
OUTL3	DGRA	80171	1	2	3	1.7
OUTL3	DGRA	80172	1	2	3	0.4
OUTL3	DGRA	80173	1	2	3	0.4
OUTL3	DGRA	80174	1	2	3	0.4
OUTL3	DGRA	80175	1	2	3	0.4
OUTL3	DGRA	80176	1	2	3	14.1
OUTL3	DGRA	80177	1	2	3	17.5
OUTL3	DGRA	80178	1	2	3	21.0
OUTL3	DGRA	80179	1	2	3	35.6
OUTL3	DGRA	80180	1	2	3	0.4
OUTL3	DGRA	80181	1	2	3	0.9
OUTL3	DGRA	80182	1	2	3	0.4
OUTL3	DGRA	80183	1	2	3	2.4
OUTL3	DGRA	80184	1	2	3	13.6
OUTL3	DGRA	80185	1	2	3	0.4
OUTL3	DGRA	80186	1	2	3	0.4
OUTL3	DGRA	80187	1	2	3	0.4
OUTL3	DGRA	80188	1	2	3	0.4
OUTL3	DGRA	80189	1	2	3	36.8
OUTL3	DGRA	80190	1	2	3	40.2
OUTL3	DGRA	80191	1	2	3	31.2
OUTL3	DGRA	80192	1	2	3	17.1
OUTL3	DGRA	80193	1	2	3	35.5
OUTL3	DGRA	80194	1	2	3	16.3
OUTL3	DGRA	80195	1	2	3	11.2
OUTL3	DGRA	80196	1	2	3	69.5
OUTL3	DGRA	80197	1	2	3	29.0
OUTL3	DGRA	80198	1	2	3	29.0
OUTL3	DGRA	80199	1	2	3	0.4
OUTL3	DGRA	80200	1	2	3	0.4
OUTL3	DGRA	80201	1	2	3	0.4
OUTL3	DGRA	80202	1	2	3	0.4
OUTL3	DGRA	80203	1	2	3	0.4
OUTL3	DGRA	80204	1	2	3	11.2
OUTL3	DGRA	80205	1	2	3	0.4
OUTL3	DGRA	80206	1	2	3	6.7

OUTL3	DGRA	80207	1	2	3	0.4
OUTL3	DGRA	80208	1	2	3	0.4
OUTL3	DGRA	80209	1	2	3	0.4
OUTL3	DGRA	80210	1	2	3	0.4
OUTL3	DGRA	80211	1	2	3	23.1
OUTL3	DGRA	80212	1	2	3	33.0
OUTL3	DGRA	80213	1	2	3	0.4
OUTL3	DGRA	80214	1	2	3	0.4
OUTL3	DGRA	80215	1	2	3	0.4
OUTL3	DGRA	80216	1	2	3	0.4
OUTL3	DGRA	80217	1	2	3	5.9
OUTL3	DGRA	80218	1	2	3	10.8
OUTL3	DGRA	80219	1	2	3	0.4
OUTL3	DGRA	80220	1	2	3	0.4
OUTL3	DGRA	80221	1	2	3	5.2
OUTL3	DGRA	80222	1	2	3	0.4
OUTL3	DGRA	80223	1	2	3	17.1
OUTL3	DGRA	80224	1	2	3	30.2
OUTL3	DGRA	80225	1	2	3	19.6
OUTL3	DGRA	80226	1	2	3	39.1
OUTL3	DGRA	80227	1	2	3	0.4
OUTL3	DGRA	80228	1	2	3	23.1
OUTL3	DGRA	80229	1	2	3	0.4
OUTL3	DGRA	80230	1	2	3	0.4
OUTL3	DGRA	80231	1	2	3	2.3
OUTL3	DGRA	80232	1	2	3	21.9
OUTL3	DGRA	80233	1	2	3	10.6
OUTL3	DGRA	80234	1	2	3	15.2
OUTL3	DGRA	80235	1	2	3	0.4
OUTL3	DGRA	80236	1	2	3	1.8
OUTL3	DGRA	80237	1	2	3	0.4
OUTL3	DGRA	80238	1	2	3	4.5
OUTL3	DGRA	80239	1	2	3	0.4
OUTL3	DGRA	80240	1	2	3	0.4
OUTL3	DGRA	80241	1	2	3	0.4
OUTL3	DGRA	80242	1	2	3	0.4
OUTL3	DGRA	80243	1	2	3	0.4
OUTL3	DGRA	80244	1	2	3	13.3
OUTL3	DGRA	80245	1	2	3	0.4
OUTL3	DGRA	80246	1	2	3	10.7
OUTL3	DGRA	80247	1	2	3	1.7
OUTL3	DGRA	80248	1	2	3	1.1
OUTL3	DGRA	80249	1	2	3	6.8
OUTL3	DGRA	80250	1	2	3	0.4
OUTL3	DGRA	80251	1	2	3	2.0
OUTL3	DGRA	80252	1	2	3	14.9
OUTL3	DGRA	80253	1	2	3	18.3
OUTL3	DGRA	80254	1	2	3	5.1
OUTL3	DGRA	80255	1	2	3	0.4
OUTL3	DGRA	80256	1	2	3	0.4
OUTL3	DGRA	80257	1	2	3	17.5
OUTL3	DGRA	80258	1	2	3	0.4
OUTL3	DGRA	80259	1	2	3	20.7
OUTL3	DGRA	80260	1	2	3	14.3
OUTL3	DGRA	80261	1	2	3	0.4
OUTL3	DGRA	80262	1	2	3	0.4
OUTL3	DGRA	80263	1	2	3	1.4
OUTL3	DGRA	80264	1	2	3	0.4
OUTL3	DGRA	80265	1	2	3	8.3
OUTL3	DGRA	80266	1	2	3	30.2

OUTL3	DGRA 80267	1	2	3	0.4
OUTL3	DGRA 80268	1	2	3	0.4
OUTL3	DGRA 80269	1	2	3	0.4
OUTL3	DGRA 80270	1	2	3	0.4
OUTL3	DGRA 80271	1	2	3	0.4
OUTL3	DGRA 80272	1	2	3	0.4
OUTL3	DGRA 80273	1	2	3	0.4
OUTL3	DGRA 80274	1	2	3	13.6
OUTL3	DGRA 80275	1	2	3	0.7
OUTL3	DGRA 80276	1	2	3	0.4
OUTL3	DGRA 80277	1	2	3	0.4
OUTL3	DGRA 80278	1	2	3	0.4
OUTL3	DGRA 80279	1	2	3	0.4
OUTL3	DGRA 80280	1	2	3	0.4
OUTL3	DGRA 80281	1	2	3	1.9
OUTL3	DGRA 80282	1	2	3	6.3
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OUTL3	DGRA 80284	1	2	3	0.4
OUTL3	DGRA 80285	1	2	3	0.4
OUTL3	DGRA 80286	1	2	3	16.0
OUTL3	DGRA 80287	1	2	3	0.4
OUTL3	DGRA 80288	1	2	3	1.7
OUTL3	DGRA 80289	1	2	3	0.4
OUTL3	DGRA 80290	1	2	3	12.6
OUTL3	DGRA 80291	1	2	3	2.9
OUTL3	DGRA 80292	1	2	3	0.4
OUTL3	DGRA 80293	1	2	3	0.4
OUTL3	DGRA 80294	1	2	3	0.4
OUTL3	DGRA 80295	1	2	3	7.7
OUTL3	DGRA 80296	1	2	3	0.4
OUTL3	DGRA 80297	1	2	3	13.4
OUTL3	DGRA 80298	1	2	3	0.4
OUTL3	DGRA 80299	1	2	3	0.4
OUTL3	DGRA 80300	1	2	3	0.4
OUTL3	DGRA 80301	1	2	3	10.0
OUTL3	DGRA 80302	1	2	3	6.1
OUTL3	DGRA 80303	1	2	3	0.4
OUTL3	DGRA 80304	1	2	3	0.4
OUTL3	DGRA 80305	1	2	3	9.2
OUTL3	DGRA 80306	1	2	3	8.7
OUTL3	DGRA 80307	1	2	3	22.7
OUTL3	DGRA 80308	1	2	3	0.4
OUTL3	DGRA 80309	1	2	3	0.4
OUTL3	DGRA 80310	1	2	3	0.4
OUTL3	DGRA 80311	1	2	3	0.4
OUTL3	DGRA 80312	1	2	3	0.4
OUTL3	DGRA 80313	1	2	3	0.4
OUTL3	DGRA 80314	1	2	3	0.4
OUTL3	DGRA 80315	1	2	3	6.7
OUTL3	DGRA 80316	1	2	3	10.1
OUTL3	DGRA 80317	1	2	3	2.4
OUTL3	DGRA 80318	1	2	3	0.4
OUTL3	DGRA 80319	1	2	3	0.4
OUTL3	DGRA 80320	1	2	3	0.4
OUTL3	DGRA 80321	1	2	3	0.4
OUTL3	DGRA 80322	1	2	3	0.4
OUTL3	DGRA 80323	1	2	3	52.3
OUTL3	DGRA 80324	1	2	3	25.3
OUTL3	DGRA 80325	1	2	3	0.4
OUTL3	DGRA 80326	1	2	3	7.3

OUTL3 DGRA 80327		1		2		3	0.4		
OUTL3 DGRA 80328		1		2		3	0.4		
OUTL3 DGRA 80329		1		2		3	6.4		
OUTL3 DGRA 80330		1		2		3	2.9		
OUTL3 DGRA 80331		1		2		3	11.0		
OUTL3 DGRA 80332		1		2		3	0.4		
OUTL3 DGRA 80333		1		2		3	0.4		
OUTL3 DGRA 80334		1		2		3	0.4		
OUTL3 DGRA 80335		1		2		3	0.4		
OUTL3 DGRA 80336		1		2		3	0.4		
OUTL3 DGRA 80337		1		2		3	10.5		
OUTL3 DGRA 80338		1		2		3	1.3		
OUTL3 DGRA 80339		1		2		3	4.0		
OUTL3 DGRA 80340		1		2		3	0.4		
OUTL3 DGRA 80341		1		2		3	0.4		
OUTL3 DGRA 80342		1		2		3	0.4		
OUTL3 DGRA 80343		1		2		3	1.3		
OUTL3 DGRA 80344		1		2		3	117.4		
OUTL3 DGRA 80345		1		2		3	117.0		
OUTL3 DGRA 80346		1		2		3	63.5		
OUTL3 DGRA 80347		1		2		3	33.8		
OUTL3 DGRA 80348		1		2		3	22.5		
OUTL3 DGRA 80349		1		2		3	6.0		
OUTL3 DGRA 80350		1		2		3	25.1		
OUTL3 DGRA 80351		1		2		3	10.8		
OUTL3 DGRA 80352		1		2		3	18.8		
OUTL3 DGRA 80353		1		2		3	10.2		
OUTL3 DGRA 80354		1		2		3	0.4		
OUTL3 DGRA 80355		1		2		3	12.8		
OUTL3 DGRA 80356		1		2		3	16.7		
OUTL3 DGRA 80357		1		2		3	33.2		
OUTL3 DGRA 80358		1		2		3	0.4		
OUTL3 DGRA 80359		1		2		3	11.8		
OUTL3 DGRA 80360		1		2		3	24.7		
OUTL3 DGRA 80361		1		2		3	0.4		
OUTL3 DGRA 80362		1		2		3	0.4		
OUTL3 DGRA 80363		1		2		3	11.4		
OUTL3 DGRA 80364		1		2		3	8.4		
OUTL3 DGRA 80365		1		2		3	0.4		
OUTL3 DGRA 80366		1		2		3	12.1		
QQ1	24	41							
Q2 80 1	7.5	6.7	6.2	6.1	5.8	5.4	5.3	5.0	4.8
Q2 80 10	4.7	5.0	4.8	4.5	4.4	4.5	5.6	6.2	5.9
Q2 80 19	5.7	5.9	28.4	61.0	35.5	20.3	14.3	11.5	9.9
Q2 80 28	9.2	8.7	8.3	7.8	7.0	6.6	6.4	6.1	5.9
Q2 80 37	5.8	5.6	21.5	57.9	22.5	17.3	15.5	14.3	13.2
Q2 80 46	13.1	11.9	10.4	9.3	8.6	8.1	7.5	6.9	6.5
Q2 80 55	6.1	5.7	5.3	5.1	5.0	4.9	4.8	4.7	4.6
Q2 80 64	4.6	4.4	4.3	4.2	4.2	4.1	4.0	4.0	8.3
Q2 80 73	7.5	6.3	5.8	23.3	31.8	20.9	16.5	13.7	11.8
Q2 80 82	10.2	15.6	27.8	18.5	13.6	11.4	10.8	13.7	29.1
Q2 80 91	20.5	15.2	12.2	10.6	9.0	7.9	7.2	6.7	6.6
Q2 80100	6.3	5.9	6.5	12.2	35.0	56.6	33.4	21.4	16.3
Q2 80109	16.3	13.0	11.0	9.6	8.4	7.5	6.8	54.6	28.7
Q2 80118	19.5	14.2	11.8	10.0	20.3	17.8	18.8	14.7	12.0
Q2 80127	9.8	8.2	7.5	6.6	5.9	5.4	11.9	15.9	10.2
Q2 80136	10.4	72.7	38.5	21.0	14.5	11.8	17.4	28.6	26.0
Q2 80145	15.6	11.4	8.5	8.7	14.3	13.6	10.9	8.9	7.6
Q2 80154	6.6	5.8	5.3	4.9	4.5	4.4	4.2	4.1	4.0
Q2 80163	3.8	3.6	3.5	3.4	3.3	3.3	3.3	3.3	4.4

Q2 80172	5.4	4.8	4.3	4.0	3.8	3.3	3.2	3.0	3.0
Q2 80181	2.9	2.8	2.8	2.8	2.8	2.8	2.7	2.6	2.5
Q2 80190	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.3
Q2 80199	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Q2 80208	3.7	4.7	3.7	3.1	2.9	2.7	2.6	2.5	2.5
Q2 80217	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3
Q2 80226	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2
Q2 80235	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
Q2 80244	2.4	2.4	2.4	2.8	2.7	2.5	2.4	2.4	2.4
Q2 80253	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2
Q2 80262	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.9	3.1
Q2 80271	3.2	85.0	66.0	23.8	14.4	10.2	7.9	6.4	5.5
Q2 80280	4.9	4.4	4.1	3.9	3.7	3.5	3.4	3.3	3.1
Q2 80289	3.0	3.1	54.8	36.3	15.0	10.3	8.5	7.1	6.0
Q2 80298	5.3	4.7	4.4	6.5	8.4	7.0	6.1	5.6	5.2
Q2 80307	4.9	4.6	4.3	4.1	4.0	3.9	3.8	3.7	3.7
Q2 80316	3.7	3.7	3.6	9.5	10.6	9.3	15.7	15.1	12.1
Q2 80325	10.0	8.5	7.6	7.2	6.7	6.1	5.8	6.3	6.1
Q2 80334	5.8	5.5	5.4	5.2	4.9	4.8	4.7	4.7	4.5
Q2 80343	141.0	179.6	45.9	24.9	17.6	13.7	11.3	10.1	8.9
Q2 80352	7.8	7.2	6.6	6.0	5.6	5.3	5.2	5.0	4.8
Q2 80361	4.6	4.5	4.4	4.3	4.2	4.1			
WQ1 ALG1	8784	1							
ALG1	0.	0.							
WQ1 ALG2	8784	1							
ALG2	0.	0.							
WQ1 ALG3	8784	1							
ALG3	0.	0.							
WQ1 ALK	168	6							
ALK1	29.	31.	34.	8.	24.	29.	22.	26.	31.
ALK2	41.	27.	13.	16.	20.	25.	5.	24.	15.
ALK3	19.	24.	22.	28.	30.	38.	44.	38.	46.
ALK4	50.	46.	47.	42.	46.	48.	48.	46.	45.
ALK5	46.	48.	47.	13.	28.	36.	22.	25.	31.
ALK6	38.	23.	26.	30.	10.	28.	27.	34.	
WQ1 DOC	168	6							
DOC1	11.	12.	14.	15.	6.7	5.8	6.2	4.4	1.3
DOC2	1.1	5.0	8.9	8.4	5.6	6.2	6.7	9.3	6.2
DOC3	8.4	24.	7.6	4.7	6.0	7.3	8.9	9.6	4.4
DOC4	8.0	4.7	7.6	9.8	9.8	6.7	15.	8.0	8.4
DOC5	8.4	15.	7.3	7.1	4.4	4.8	5.1	9.6	4.4
DOC6	6.4	10.	19.	6.2	13.	19.	5.8	6.4	
WQ1 NH4	168	6							
NH41	0.10	0.03	0.01	0.00	0.11	0.00	0.07	0.05	0.02
NH42	0.01	0.07	0.08	0.07	0.04	0.00	0.13	0.03	0.05
NH43	0.00	0.21	0.12	0.03	0.04	0.04	0.05	0.05	0.04
NH44	0.09	0.07	0.06	0.03	0.07	0.00	0.04	0.01	0.06
NH45	0.09	0.12	0.08	0.04	0.04	0.04	0.04	0.03	0.03
NH46	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	
WQ1 NO2	8784	1							
NO2	0.0	0.0							
WQ1 NO3	168	6							
NO31	0.420	0.370	0.170	0.200	0.260	0.230	0.200	0.160	0.030
NO32	0.000	0.000	0.100	0 110	0.120	0.080	0.150	0.030	0.120
NO33	0.140	0.210	0.180	0.190	0.170	0.140	0.040	0.100	0.040
NO34	0.040	0.020	0.020	0.090	0.010	0.000	0.010	0.010	0.010
NO35	0.310	0.010	0.010	1.230	0.090	0.090	0.090	0.090	0.090
NO36	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	
WQ1 FCOL	168	6							
FCOLI1	17.	13.	11.	14.	17.	101.	10.	10.	10.

FCOLI2	1.	3.	10.	720.	500.	90.	38.	258.	25.
FCOLI3	142.	64.	47.	30.	80.	990.	2260.	55.	245.
FCOLI4	200.	310.	4600.	900.	10.	2.	1500.	2.	123.
FCOLI5	4.	0.	0.	190.	190.	190.	190.	190.	190.
FCOLI6	190.	190.	190.	190.	190.	190.	190.	190.	
WQ1 DET	168	6							
DET1	0.9	0.4	0.0	0.0	0.4	0.2	0.2	0.2	0.3
DET2	0.2	0.2	0.2	0.7	0.7	0.8	0.9	0.0	0.0
DET3	0.4	1.6	0.9	0.7	0.7	0.2	0.2	0.9	0.4
DET4	0.7	0.7	0.4	1.1	1.1	0.7	0.4	0.4	0.4
DET5	0.4	0.9	0.9	0.9	1.3	1.0	0.7	0.7	0.4
DET6	0.7	0.7	0.2	0.2	0.3	0.4	0.2	0.2	
WQ1 DO	168	6							
DO1	13.9	14.0	10.0	10.4	11.6	12.2	12.2	11.2	10.4
DO2	10.6	8.6	8.8	9.8	10.8	10.8	10.1	9.2	10.3
DO3	7.6	7.1	9.9	8.7	7.2	8.1	5.8	6.9	6.0
DO4	4.2	5.3	5.5	7.2	6.1	5.8	5.6	5.4	6.2
DO5	7.5	6.7	6.4	8.0	7.8	9.4	8.1	8.2	10.2
DO6	10.2	10.2	11.6	9.0	8.7	10.1	12.5	12.5	
WQ1 PO4	168	6							
PO41	0.016	0.012	0.005	0.051	0.013	0.009	0.016	0.006	0.010
PO42	0.002	0.001	0.015	0.008	0.011	0.005	0.016	0.006	0.010
PO43	0.012	0.036	0.017	0.013	0.001	0.015	0.010	0.017	0.033
PO44	0.031	0.012	0.013	0.045	0.022	0.018	0.013	0.003	0.012
PO45	0.012	0.011	0.009	0.030	0.015	0.015	0.014	0.017	0.010
PO46	0.006	0.027	0.014	0.008	0.020	0.022	0.012	0.008	
WQ1 SIL	8784	1							
SIL	0.	0.							
WQ1 TEMP	24	41							
T2 80 1	6.8	6.7	7.0	6.3	6.4	6.1	6.6	5.7	5.2
T2 80 10	5.4	7.1	6.6	5.5	5.6	7.3	9.5	8.6	9.0
T2 80 19	9.5	9.9	9.4	9.5	8.6	8.4	8.7	9.5	9.5
T2 80 28	8.3	6.8	5.9	5.1	4.2	1.5	2.2	3.0	4.1
T2 80 37	5.2	4.7	4.2	4.3	2.9	3.0	3.6	3.4	5.7
T2 80 46	8.0	7.7	4.9	5.1	5.6	6.8	8.9	11.7	11.1
T2 80 55	11.1	9.2	7.5	7.1	9.2	9.4	7.0	4.7	4.5
T2 80 64	5.6	6.9	7.7	10.2	11.7	11.2	11.8	11.2	9.1
T2 80 73	10.6	10.0	9.5	11.1	11.2	10.5	10.6	11.6	11.2
T2 80 82	11.3	11.0	9.9	9.5	9.5	10.1	11.7	12.2	10.3
T2 80 91	10.4	12.5	14.1	16.0	15.5	14.7	15.3	16.2	17.2
T2 80100	16.3	16.0	16.0	14.3	10.0	8.6	10.4	12.6	13.9
T2 80109	14.3	14.9	16.1	17.2	18.0	18.3	18.4	16.1	13.3
T2 80118	12.9	13.7	15.3	15.8	15.4	15.5	15.5	15.9	16.5
T2 80127	17.8	18.5	18.0	17.4	17.9	19.6	19.8	20.1	20.6
T2 80136	18.6	19.0	20.0	20.3	20.7	20.8	20.5	19.6	18.7
T2 80145	18.4	20.4	22.0	22.8	22.1	19.9	21.0	22.7	23.7
T2 80154	24.1	24.5	25.1	25.8	26.1	25.9	25.5	23.0	22.8
T2 80163	24.0	24.6	24.6	25.9	26.6	27.6	27.0	26.8	25.3
T2 80172	25.4	25.2	25.6	24.4	25.3	26.5	27.2	27.9	28.3
T2 80181	28.6	28.5	28.7	28.9	30.9	30.8	30.4	30.6	30.7
T2 80190	30.7	30.8	30.8	30.7	30.5	30.5	30.5	30.5	30.5
T2 80199	30.6	30.2	30.2	30.2	29.8	29.5	28.5	27.7	27.3
T2 80208	27.1	25.0	26.7	27.6	28.5	28.8	29.3	29.3	29.1
T2 80217	28.6	28.5	28.5	28.8	28.9	29.1	28.7	28.9	29.0
T2 80226	28.8	28.5	29.6	29.6	29.6	29.5	29.2	29.1	28.8
T2 80235	28.6	28.2	27.1	27.8	27.7	27.8	27.0	26.4	26.1
T2 80244	26.5	27.1	27.4	27.0	27.1	27.3	27.2	27.1	26.8
T2 80253	26.4	26.6	26.7	26.6	25.8	25.5	25.9	26.4	26.2
T2 80262	24.7	24.6	25.0	25.5	26.0	25.9	24.5	23.7	22.3
T2 80271	19.9	16.6	17.2	18.8	19.8	20.0	18.7	17.7	17.5

T2 80280	16.9	17.0	17.8	19.1	20.1	20.2	18.2	17.1	16.9
T2 80289	17.9	18.9	19.1	18.7	18.0	16.7	16.4	16.4	16.7
T2 80298	16.6	14.5	13.6	14.3	13.9	13.1	12.1	11.8	12.3
T2 80307	12.7	13.2	13.8	13.5	13.7	14.1	14.5	15.4	16.5
T2 80316	16.2	14.6	13.5	13.2	13.0	11.7	10.3	9.7	8.7
T2 80325	8.2	8.1	8.1	9.0	9.7	8.9	8.0	7.1	6.9
T2 80334	7.3	7.8	9.7	10.5	9.0	8.8	10.4	11.6	11.9
T2 80343	12.3	11.7	11.0	10.3	10.1	10.1	9.9	9.6	10.1
T2 80352	9.9	9.8	9.5	5.6	4.0	3.4	3.4	5.0	3.6
T2 80361	2.8	4.4	3.4	4.6	5.5	6.0			
WQ1 DS	168	6							
DS1	70.	90.	64.	39.	22.	11.	67.	22.	42.
DS2	63.	60.	59.	53.	48.	50.	54.	51.	47.
DS3	38.	30.	30.	32.	35.	63.	60.	73.	71.
DS4	50.	60.	88.	113.	41.	61.	42.	22.	59.
DS5	50.	94.	92.	89.	87.	84.	82.	80.	77.
DS6	75.	75.	75.	75.	75.	75.	75.	75.	
WQ1 SS	168	6							
SS1	62.	0.	17.	34.	38.	24.	11.	27.	22.
SS2	16.	9.	25.	34.	10.	6.	13.	19.	31.
SS3	20.	10.	0.	4.	8.	1.	0.	13.	513.
SS4	0.	5.	0.	0.	0.	18.	37.	56.	12.
SS5	19.	0.	3.	3.	3.	3.	3.	3.	3.
SS6	6.	6.	6.	6.	6.	6.	6.	6.	
WQ1 PH	168	6							
PH1	6.6	6.6	6.3	6.2	6.2	6.5	6.7	6.7	6.7
PH2	6.4	7.2	5.6	6.1	6.5	6.6	6.4	6.5	6.4
PH3	6.5	6.6	6.8	7.0	6.4	6.6	6.5	6.9	6.5
PH4	7.3	6.6	6.8	6.3	6.5	6.3	6.8	6.8	6.9
PH5	7.0	7.0	7.0	6.2	6.6	6.8	6.5	7.2	7.1
PH6	7.3	7.2	7.2	6.7	6.4	6.4	6.3	6.4	
WQ1ANAER	168	53							
WQ2 1	0.0	0.0	0.4	0.0	0.0	4.0	0.0		
WQ2 2	0.0	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2 3	0.0	0.0	0.3	0.0	0.0	5.0	0.0		
WQ2 4	0.0	0.0	1.6	0.0	0.0	6.0	0.0		
WQ2 5	0.0	0.0	0.4	0.0	0.0	6.0	0.0		
WQ2 6	0.0	0.0	0.3	0.0	0.0	7.0	0.0		
WQ2 7	0.0	0.0	0.1	0.0	0.0	5.3	0.0		
WQ2 8	0.0	0.0	0.4	0.0	0.0	5.4	0.0		
WQ2 9	0.0	0.0	0.2	0.0	0.0	8.5	0.0		
WQ2 10	0.0	0.0	0.1	0.0	0.0	6.0	0.0		
WQ2 11	0.0	0.0	0.1	0.0	0.0	8.4	0.0		
WQ2 12	0.0	0.0	0.4	0.0	0.0	7.3	0.0		
WQ2 13	0.0	0.0	0.4	0.0	0.0	4.3	0.0		
WQ2 14	0.0	0.0	0.2	0.0	0.0	4.8	0.0		
WQ2 15	0.0	0.0	0.1	0.0	0.0	4.5	0.0		
WQ2 16	0.0	0.0	0.3	0.0	0.0	3.7	0.0		
WQ2 17	0.0	0.0	0.2	0.0	0.0	6.7	0.0		
WQ2 18	0.0	0.0	0.2	0.0	0.0	5.2	0.0		
WQ2 19	0.1	0.0	0.5	0.0	0.0	5.1	0.0		
WQ2 20	0.0	0.0	1.4	0.0	0.0	4.2	0.0		
WQ2 21	0.0	0.0	0.4	0.0	0.0	5.4	0.0		
WQ2 22	0.2	0.0	0.5	0.0	0.0	4.3	0.0		
WQ2 23	0.4	0.0	0.2	0.0	0.0	1.7	0.0		
WQ2 24	0.4	0.0	0.4	0.0	0.0	7.4	0.0		
WQ2 25	0.0	0.0	0.2	0.0	0.0	8.4	0.0		
WQ2 26	0.2	0.0	0.2	0.0	0.0	6.1	0.0		
WQ2 27	0.1	0.0	0.3	0.0	0.0	6.6	0.0		
WQ2 28	0.2	0.0	0.1	0.0	0.0	7.2	0.0		

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END

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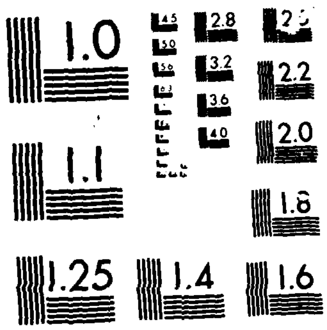

MICROCOPY RESOLUTION TEST CHART

WQ2 29	0.1	0.0	0.3	0.0	0.0	7.7	0.0		
WQ2 30	0.1	0.0	0.3	0.0	0.0	6.8	0.0		
WQ2 31	0.1	0.0	0.1	0.0	0.0	8.9	0.0		
WQ2 32	0.1	0.0	0.1	0.0	0.0	7.8	0.0		
WQ2 33	0.3	0.0	0.1	0.0	0.0	7.3	0.0		
WQ2 34	0.0	0.0	0.0	0.0	0.0	7.5	0.0		
WQ2 35	0.1	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2 36	0.0	0.0	0.4	0.0	0.0	9.4	0.0		
WQ2 37	0.0	0.0	0.3	0.0	0.0	11.9	0.0		
WQ2 38	0.0	0.0	0.1	0.0	0.0	11.0	0.0		
WQ2 39	0.2	0.0	0.1	0.0	0.0	8.8	0.0		
WQ2 40	0.2	0.0	0.2	0.0	0.0	10.6	0.0		
WQ2 41	0.2	0.0	0.1	0.0	0.0	11.3	0.0		
WQ2 42	0.2	0.0	0.0	0.0	0.0	12.0	0.0		
WQ2 43	0.2	0.0	0.1	0.0	0.0	10.0	0.0		
WQ2 44	0.2	0.0	0.2	0.0	0.0	11.0	0.0		
WQ2 45	0.0	0.0	0.3	0.0	0.0	12.0	0.0		
WQ2 46	0.1	0.0	0.0	0.0	0.0	11.0	0.0		
WQ2 47	0.0	0.0	0.0	0.0	0.0	9.0	0.0		
WQ2 48	0.0	0.0	0.1	0.0	0.0	14.0	0.0		
WQ2 49	0.0	0.0	0.2	0.0	0.0	9.0	0.0		
WQ2 50	0.1	0.0	1.2	0.0	0.0	4.0	0.0		
WQ2 51	0.0	0.0	0.1	0.0	0.0	9.0	0.0		
WQ2 52	0.0	0.0	0.1	0.0	0.0	9.0	0.0		
WQ2 53	0.0	0.0	0.1	0.0	0.0	10.0	0.0		
Q1	24	41							
Q3 80 1	5.1	4.6	4.2	4.1	3.9	3.7	3.6	3.4	3.3
Q3 80 10	3.2	3.4	3.3	3.1	3.0	3.1	3.8	4.2	4.0
Q3 80 19	3.9	4.0	19.3	41.5	24.1	13.8	9.7	7.8	6.7
Q3 80 28	6.3	5.9	5.6	5.3	4.8	4.5	4.4	4.1	4.0
Q3 80 37	3.9	3.8	14.6	25.8	15.3	11.8	10.5	9.7	9.0
Q3 80 46	8.9	8.1	7.1	6.3	5.8	5.5	5.1	4.7	4.4
Q3 80 55	4.1	3.9	3.6	3.5	3.4	3.3	3.3	3.2	3.1
Q3 80 64	3.1	3.0	2.9	2.9	2.9	2.8	2.7	2.7	5.6
Q3 80 73	5.1	4.3	3.9	15.8	21.6	14.2	11.2	9.3	8.0
Q3 80 82	6.9	10.6	18.9	12.6	9.2	7.8	7.3	9.3	19.8
Q3 80 91	13.9	10.3	8.3	7.2	6.1	5.4	4.9	4.6	4.5
Q3 80100	4.3	4.0	4.4	8.3	23.8	38.5	22.7	14.6	11.1
Q3 80109	11.1	8.8	7.5	6.5	5.7	5.1	4.6	37.1	19.5
Q3 80118	13.3	9.7	8.0	6.8	13.8	12.1	12.8	10.0	8.2
Q3 80127	6.7	5.6	5.1	4.5	4.0	3.7	8.1	10.8	6.9
Q3 80136	7.1	49.4	26.2	14.3	9.9	8.0	11.8	19.4	17.7
Q3 80145	10.6	7.8	5.8	5.9	9.7	9.2	7.4	6.1	5.2
Q3 80154	4.5	3.9	3.6	3.3	3.1	3.0	2.9	2.8	2.7
Q3 80163	2.6	2.4	2.4	2.3	2.2	2.2	2.2	2.2	3.0
Q3 80172	3.7	3.3	2.9	2.7	2.6	2.2	2.2	2.0	2.0
Q3 80181	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.7
Q3 80190	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.6
Q3 80199	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Q3 80208	2.5	3.2	2.5	2.1	2.0	1.8	1.8	1.7	1.7
Q3 80217	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Q3 80226	1.6	1.6	1.5	1.5	1.5	1.5	1.6	1.5	1.5
Q3 80235	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6
Q3 80244	1.6	1.6	1.6	1.9	1.8	1.7	1.6	1.6	1.6
Q3 80253	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5
Q3 80262	1.6	1.6	1.6	1.6	1.6	1.6	1.6	2.0	2.1
Q3 80271	2.2	57.8	44.9	16.2	9.8	6.9	5.4	4.4	3.7
Q3 80280	3.3	3.0	2.8	2.7	2.5	2.4	2.3	2.2	2.1
Q3 80289	2.0	2.1	37.3	24.7	10.2	7.0	5.8	4.8	4.1
Q3 80298	3.6	3.2	3.0	4.4	5.7	4.8	4.1	3.8	3.5

Q3 80307	3.3	3.1	2.9	2.8	2.7	2.7	2.6	2.5	2.5
Q3 80316	2.5	2.5	2.4	6.5	7.2	6.3	10.7	10.3	8.2
Q3 80325	6.8	5.8	5.2	4.9	4.6	4.1	3.9	4.3	4.1
Q3 80334	3.9	3.7	3.7	3.5	3.3	3.3	3.2	3.2	3.1
Q3 80343	95.9	122.1	31.2	16.9	12.0	9.3	7.7	6.9	6.1
Q3 80352	5.3	4.9	4.5	4.1	3.8	3.6	3.5	3.4	3.3
Q3 80361	3.1	3.1	3.0	2.9	2.9	2.8			
WQ1 ALG1	8784	1							
ALG1	0.	0.							
WQ1 ALG2	8784	1							
ALG2	0.	0.							
WQ1 ALG3	8784	1							
ALG3	0.	0.							
WQ1 ALK	168	6							
ALK1	29.	31.	34.	8.	24.	29.	22.	26.	31.
ALK2	41.	27.	13.	16.	20.	25.	5.	24.	15.
ALK3	19.	24.	22.	28.	30.	38.	44.	38.	46.
ALK4	50.	46.	47.	42.	46.	48.	48.	46.	45.
ALK5	46.	48.	47.	13.	28.	36.	22.	25.	31.
ALK6	38.	23.	26.	30.	10.	28.	27.	34.	
WQ1 DOC	168	6							
DOC1	11.	12.	14.	15.	6.7	5.8	6.2	4.4	1.3
DOC2	1.1	5.0	8.9	8.4	5.6	6.2	6.7	9.3	6.2
DOC3	8.4	24.	7.6	4.7	6.0	7.3	8.9	9.6	4.4
DOC4	8.0	4.7	7.6	9.8	9.8	6.7	15.	8.0	8.4
DOC5	8.4	15.	7.3	7.1	4.4	4.8	5.1	9.6	4.4
DOC6	6.4	10.	19.	6.2	13.	19.	5.8	6.4	
WQ1 NH4	168	6							
NH41	0.10	0.03	0.01	0.00	0.11	0.00	0.07	0.05	0.02
NH42	0.01	0.07	0.08	0.07	0.04	0.00	0.13	0.03	0.05
NH43	0.00	0.21	0.12	0.03	0.04	0.04	0.05	0.05	0.04
NH44	0.09	0.07	0.06	0.03	0.07	0.00	0.04	0.01	0.06
NH45	0.09	0.12	0.08	0.04	0.04	0.04	0.04	0.03	0.03
NH46	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	
WQ1 NO2	8784	1							
NO2	0.0	0.0							
WQ1 NO3	168	6							
NO31	0.420	0.370	0.170	0.200	0.260	0.230	0.200	0.160	0.030
NO32	0.000	0.000	0.100	0.110	0.120	0.080	0.150	0.030	0.120
NO33	0.140	0.210	0.180	0.190	0.170	0.140	0.040	0.100	0.040
NO34	0.040	0.020	0.020	0.090	0.010	0.000	0.010	0.010	0.010
NO35	0.010	0.010	0.010	1.230	0.090	0.090	0.090	0.090	0.090
NO36	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	
WQ1 FCOL	168	6							
FCOLI1	17.	13.	11.	14.	17.	101.	10.	10.	10.
FCOLI2	1.	3.	10.	720.	500.	90.	38.	258.	25.
FCOLI3	142.	64.	47.	30.	80.	990.	2260.	55.	245.
FCOLI4	200.	310.	4600.	900.	10.	2.	1500.	2.	123.
FCOLI5	4.	0.	0.	190.	190.	190.	190.	190.	190.
FCOLI6	190.	190.	190.	190.	190.	190.	190.	190.	
WQ1 DET	168	6							
DET1	0.9	0.4	0.0	0.0	0.4	0.2	0.2	0.2	0.3
DET2	0.2	0.2	0.2	0.7	0.7	0.8	0.9	0.0	0.0
DET3	0.4	1.6	0.9	0.7	0.7	0.2	0.2	0.9	0.4
DET4	0.7	0.7	0.4	1.1	1.1	0.7	0.4	0.4	0.4
DET5	0.4	0.9	0.9	0.9	1.3	1.0	0.7	0.7	0.4
DET6	0.7	0.7	0.2	0.2	0.3	0.4	0.2	0.2	
WQ1 DO	168	6							
DO1	13.9	14.0	10.0	10.4	11.6	12.2	12.2	11.2	10.4
DO2	10.6	8.6	8.8	9.8	10.8	10.8	10.1	9.2	10.3

DO3	7.6	7.1	9.9	8.7	7.2	8.1	5.8	6.9	6.0
DO4	4.2	5.3	5.5	7.2	6.1	5.8	5.6	5.4	6.2
DO5	7.5	6.7	6.4	8.0	7.8	9.4	8.1	8.2	10.2
DO6	10.2	10.2	11.6	9.0	8.7	10.1	12.5	12.5	
WQ1 PO4	168	6							
PO41	0.016	0.012	0.005	0.051	0.013	0.009	0.016	0.006	0.010
PO42	0.002	0.001	0.015	0.008	0.011	0.005	0.016	0.006	0.010
PO43	0.012	0.036	0.017	0.013	0.001	0.015	0.010	0.017	0.033
PO44	0.031	0.012	0.013	0.045	0.022	0.018	0.013	0.003	0.012
PO45	0.012	0.011	0.009	0.030	0.015	0.015	0.014	0.017	0.010
PO46	0.006	0.027	0.014	0.008	0.020	0.022	0.012	0.008	
WQ1 SIL	8784	1							
SIL	0.	0.							
WQ1 TEMP	24	41							
T2 80 1	6.8	6.7	7.0	6.3	6.4	6.1	6.6	5.7	5.2
T2 80 10	5.4	7.1	6.6	5.5	5.6	7.3	9.5	8.6	9.0
T2 80 19	9.5	9.9	9.4	9.5	8.6	8.4	8.7	9.5	9.5
T2 80 28	8.3	6.8	5.9	5.1	4.2	1.5	2.2	3.0	4.1
T2 80 37	5.2	4.7	4.2	4.3	2.9	3.0	3.6	3.4	5.7
T2 80 46	8.0	7.7	4.9	5.1	5.6	6.8	8.9	11.7	11.1
T2 80 55	11.1	9.2	7.5	7.1	9.2	9.4	7.0	4.7	4.5
T2 80 64	5.6	6.9	7.7	10.2	11.7	11.2	11.8	11.2	9.1
T2 80 73	10.6	10.0	9.5	11.1	11.2	10.5	10.6	11.6	11.2
T2 80 82	11.3	11.0	9.9	9.5	9.5	10.1	11.7	12.2	10.3
T2 80 91	10.4	12.5	14.1	16.0	15.5	14.7	15.3	16.2	17.2
T2 80100	16.3	16.0	16.0	14.3	10.0	8.6	10.4	12.6	13.9
T2 80109	14.3	14.9	16.1	17.2	18.0	18.3	18.4	16.1	13.3
T2 80118	12.9	13.7	15.3	15.8	15.4	15.5	15.5	15.9	16.5
T2 80127	17.8	18.5	18.0	17.4	17.9	19.6	19.8	20.1	20.6
T2 80136	18.6	19.0	20.0	20.3	20.7	20.8	20.5	19.6	18.7
T2 80145	18.4	20.4	22.0	22.8	22.1	19.9	21.0	22.7	23.7
T2 80154	24.1	24.5	25.1	25.8	26.1	25.9	25.5	23.0	22.8
T2 80163	24.0	24.6	24.6	25.9	26.6	27.6	27.0	26.8	25.3
T2 80172	25.4	25.2	25.6	24.4	25.3	26.5	27.2	27.9	23.3
T2 80181	28.6	28.5	28.7	28.9	30.9	30.8	30.4	30.6	30.7
T2 80190	30.7	30.8	30.8	30.7	30.5	30.5	30.5	30.5	30.5
T2 80199	30.6	30.2	30.2	30.2	29.8	29.5	28.5	27.7	27.3
T2 80208	27.1	25.0	26.7	27.6	28.5	28.8	29.3	29.3	29.1
T2 80217	28.6	28.5	28.5	28.8	28.9	29.1	28.7	28.9	29.0
T2 80226	28.8	28.5	29.6	29.6	29.6	29.5	29.2	29.1	28.8
T2 80235	28.6	28.2	27.1	27.8	27.7	27.8	27.0	26.4	26.1
T2 80244	26.5	27.1	27.4	27.0	27.1	27.3	27.2	27.1	26.8
T2 80253	26.4	26.6	26.7	26.6	25.8	25.5	25.9	26.4	26.2
T2 80262	24.7	24.6	25.0	25.5	26.0	25.9	24.5	23.7	22.3
T2 80271	19.9	16.6	17.2	18.8	19.8	20.0	18.7	17.7	17.5
T2 80280	16.9	17.0	17.8	19.1	20.1	20.2	18.2	17.1	16.9
T2 80289	17.9	18.9	19.1	18.7	18.0	16.7	16.4	16.4	16.7
T2 80298	16.6	[illegible].5	13.6	14.3	13.9	13.1	12.1	11.8	12.3
T2 80307	12.7	[illegible].2	13.8	13.5	13.7	14.1	14.5	15.4	16.5
T2 80316	16.2	14.6	13.5	13.2	13.0	11.7	10.3	9.7	8.7
T2 80325	8.2	8.1	8.1	9.0	9.7	8.9	8.0	7.1	6.9
T2 80334	7.3	7.8	9.7	10.5	9.0	8.8	10.4	11.6	11.9
T2 80343	12.3	11.7	11.0	10.3	10.1	10.1	9.9	9.6	10.1
T2 80352	9.9	9.8	9.5	5.6	4.0	3.4	3.4	5.0	3.6
T2 80361	2.8	4.4	3.4	4.6	5.5	6.0			
WQ1 DS	168	6							
DS1	70.	90.	64.	39.	22.	11.	67.	22.	42.
DS2	63.	60.	59.	53.	48.	50.	54.	51.	47.
DS3	38.	30.	30.	32.	35.	63.	60.	73.	71.
DS4	50.	60.	88.	113.	41.	61.	42.	22.	59.

DS5	50.	94.	92.	89.	87.	84.	82.	80.	77.
DS6	75.	75.	75.	75.	75.	75.	75.	75.	
WQ1 SS	168	6							
SS1	62.	0.	17.	34.	38.	24.	11.	27.	22.
SS2	16.	9.	25.	34.	10.	6.	13.	19.	31.
SS3	20.	10.	0.	4.	8.	1.	0.	13.	513.
SS4	0.	5.	0.	0.	0.	18.	37.	56.	12.
SS5	19.	0.	3.	3.	3.	3.	3.	3.	3.
SS6	6.	6.	6.	6.	6.	6.	6.	6.	
WQ1 PH	168	6							
PH1	6.6	6.6	6.3	6.2	6.2	6.5	6.7	6.7	6.7
PH2	6.4	7.2	5.6	6.1	6.5	6.6	6.4	6.5	6.4
PH3	6.5	6.6	6.8	7.0	6.4	6.6	6.5	6.9	6.5
PH4	7.3	6.6	6.8	6.3	6.5	6.3	6.8	6.8	6.9
PH5	7.0	7.0	7.0	6.2	6.6	6.8	6.5	7.2	7.1
PH6	7.3	7.2	7.2	6.7	6.4	6.4	6.3	6.4	
WQ1ANAER	168	53							
WQ2 1	0.0	0.0	0.4	0.0	0.0	4.0	0.0		
WQ2 2	0.0	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2 3	0.0	0.0	0.3	0.0	0.0	5.0	0.0		
WQ2 4	0.0	0.0	1.6	0.0	0.0	6.0	0.0		
WQ2 5	0.0	0.0	0.4	0.0	0.0	6.0	0.0		
WQ2 6	0.0	0.0	0.3	0.0	0.0	7.0	0.0		
WQ2 7	0.0	0.0	0.1	0.0	0.0	5.3	0.0		
WQ2 8	0.0	0.0	0.4	0.0	0.0	5.4	0.0		
WQ2 9	0.0	0.0	0.2	0.0	0.0	8.5	0.0		
WQ2 10	0.0	0.0	0.1	0.0	0.0	6.0	0.0		
WQ2 11	0.0	0.0	0.1	0.0	0.0	8.4	0.0		
WQ2 12	0.0	0.0	0.4	0.0	0.0	7.3	0.0		
WQ2 13	0.0	0.0	0.4	0.0	0.0	4.3	0.0		
WQ2 14	0.0	0.0	0.2	0.0	0.0	4.8	0.0		
WQ2 15	0.0	0.0	0.1	0.0	0.0	4.5	0.0		
WQ2 16	0.0	0.0	0.3	0.0	0.0	3.7	0.0		
WQ2 17	0.0	0.0	0.2	0.0	0.0	6.7	0.0		
WQ2 18	0.0	0.0	0.2	0.0	0.0	5.2	0.0		
WQ2 19	0.1	0.0	0.5	0.0	0.0	5.1	0.0		
WQ2 20	0.0	0.0	1.4	0.0	0.0	4.2	0.0		
WQ2 21	0.0	0.0	0.4	0.0	0.0	5.4	0.0		
WQ2 22	0.2	0.0	0.5	0.0	0.0	4.3	0.0		
WQ2 23	0.4	0.0	0.2	0.0	0.0	1.7	0.0		
WQ2 24	0.4	0.0	0.4	0.0	0.0	7.4	0.0		
WQ2 25	0.0	0.0	0.2	0.0	0.0	8.4	0.0		
WQ2 26	0.2	0.0	0.2	0.0	0.0	6.1	0.0		
WQ2 27	0.1	0.0	0.3	0.0	0.0	6.6	0.0		
WQ2 28	0.2	0.0	0.1	0.0	0.0	7.2	0.0		
WQ2 29	0.1	0.0	0.3	0.0	0.0	7.7	0.0		
WQ2 30	0.1	0.0	0.3	0.0	0.0	6.8	0.0		
WQ2 31	0.1	0.0	0.1	0.0	0.0	8.9	0.0		
WQ2 32	0.1	0.0	0.1	0.0	0.0	7.8	0.0		
WQ2 33	0.3	0.0	0.1	0.0	0.0	7.3	0.0		
WQ2 34	0.0	0.0	0.0	0.0	0.0	7.5	0.0		
WQ2 35	0.1	0.0	0.2	0.0	0.0	4.0	0.0		
WQ2 36	0.0	0.0	0.4	0.0	0.0	9.4	0.0		
WO2 37	0.0	0.0	0.3	0.0	0.0	11.9	0.0		
WQ2 38	0.0	0.0	0.1	0.0	0.0	11.0	0.0		
WQ2 39	0.2	0.0	0.1	0.0	0.0	8.8	0.0		
WQ2 40	0.2	0.0	0.2	0.0	0.0	10.6	0.0		
WQ2 41	0.2	0.0	0.1	0.0	0.0	11.3	0.0		
WQ2 42	0.2	0.0	0.0	0.0	0.0	12.0	0.0		
WQ2 43	0.2	0.0	0.1	0.0	0.0	10.0	0.0		

WQ2 44	0.2	0.0	0.2	0.0	0.0	11.0	0.0
WQ2 45	0.0	0.0	0.3	0.0	0.0	12.0	0.0
WQ2 46	0.1	0.0	0.0	0.0	0.0	11.0	0.0
WQ2 47	0.0	0.0	0.0	0.0	0.0	9.0	0.0
WQ2 48	0.0	0.0	0.1	0.0	0.0	14.0	0.0
WQ2 49	0.0	0.0	0.2	0.0	0.0	9.0	0.0
WQ2 50	0.1	0.0	1.2	0.0	0.0	4.0	0.0
WQ2 51	0.0	0.0	0.1	0.0	0.0	9.0	0.0
WQ2 52	0.0	0.0	0.1	0.0	0.0	9.0	0.0
WQ2 53	0.0	0.0	0.1	0.0	0.0	10.0	0.0
DIAGNOSE	99999						

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